AALTO-YLIOPISTO
School of Engineering
Degree Program in Structural Engineering and Building Technology
Professorship of Construction Management and Economics

Risto Kärkkäinen

CONCEPTUAL KNOWLEDGE MANAGEMENT FRAMEWORK OF COMPREHENSIVE RESIDENTIAL DEVELOPMENT

Thesis submitted in partial fulfilment of the requirements for the degree of Master of Science (Technology)
Espoo, 13.4.2014

Supervisor: Professor (Acting) Arto Saari, Aalto University
Instructors: M.Sc (Econ.), Pekka Helin, YIT Construction Ltd., M.Sc (Eng.) Jouko Kemppinen, YIT Construction Ltd.

Aalto University
School of Engineering

Aalto University, P.O. Box 12100, FI-00076 AALTO
www.aalto.fi

Abstract of master's thesis

Author Risto Kärkkäinen

Title of thesis Conceptual Knowledge Management Framework of Comprehensive Residential Development

Department of Civil and Structural Engineering

Professorship of Construction Management and Economics **Code of professorship** Rak-63

Thesis supervisor Professor (acting) Arto Saari

Thesis advisor(s) / Thesis examiner(s) M.Sc. (Econ.) Pekka Helin, YIT Construction Ltd. M.Sc. (Eng.) Jouko Kemppinen, YIT Construction Ltd.

Date 2014-04-13 **Number of pages:** 135 + 9 **Language** English

ABSTRACT

The target of my Master's thesis to create systemic and long-term model for Comprehensive Residential Development (CRD) knowledge management for Finnish Real estate Developer, YIT. First I collected and analysed local best practices in every business units. Secondly, I created and tested CRD knowledge management taxonomy based on analysis and theoretical framework. Finally, I developed a systemic concept for a Development Operating System, which is cloud-based CRD knowledge management system. It is a model for managing best practices continuously, where functions of project management, document repository and process management are integrated.

I organized workshops and asked professionals in each business division to share their best practices related to their areas of responsibility. The participants were instructed to share their expertise in relation to a particular project target, such as lowering risks or improving quality. Later, we refined these target areas to 16 knowledge areas of a residential area development.

Key to a long-term solution for corporate knowledge management of CRD is the establishment of the knowledge framework for project management. In order to build a scientific foundation for said knowledge framework, I consulted theoretical literature on system and process thinking and knowledge management. Moreover, I studied sample of variations in the business environments of speculative residential development. We also researched the common best practices of the industry, as well as the Project Management Body of Knowledge. I also conducted an empirical study in practices in project management and researched key variations in project types. Finally, I analysed successes of, and challenges in, 34 recently completed or ongoing residential development projects.

The CRD knowledge framework included three process management dimensions: responsibility areas (human dimension), project stages (time dimension) and knowledge areas (project target dimension). The eight Responsibility areas and six project stages are mainly based on the current process management framework in use at YIT. However, the 16 knowledge areas are based on industry best practices and the empirical study of the problem areas. The most important knowledge area specific to residential area development is phasing management, which is a process of optimizing the scope of phases and commencement order and timing of the phases.

In order to ensure the adoption of knowledge management in organisation and the best practices' implementation for the long term, I suggest development of Development Operating System (DOS).

Keywords Comprehensive residential development, Property development, best practices, knowledge management, process management

Aalto-yliopisto
Insinööritieteiden
korkeakoulu

Aalto-yliopisto, PL 12100, 00076 AALTO
www.aalto.fi
Diplomityön tiivistelmä

Tekijä Risto Kärkkäinen

Työn nimi Aluerakentamisen tietämyksen hallinnan järjestelmät

Laitos Rakenne- ja rakennustuotantotekniikan laitos

Professuuri Rakentamistalous **Professuurikoodi** Rak-63

Työn valvoja ma prof. Arto Saari

Työn ohjaaja(t)/Työn tarkastaja(t) M.Sc. (Econ.) Pekka Helin, YIT Construction Ltd. M.Sc. (Eng.) Jouko Kemppinen

Päivämäärä 2014-04-13 **Sivumäärä** 135 + 9 **Kieli** englanti

TIIVISTELMÄ

Diplomityöni tavoitteena on luoda systeeminen ja prosessiluonteinen malli aluerakentamisen tietämyksen hallintaan suomalaiselle kiinteistökehittäjille YIT:lle. Ensimmäiseksi keräsin ja analysoin paikalliset parhaat käytännöt liiketoiminta yksiköistä. Seuraavaksi loin analyysin ja teorian pohjalta taksonomian aluerakentamisen tietämyksen hallintaan, joka antaa pohjan syventävälle tutkimukselle. Lopuksi loin mallin kiinteistökehittämisen toimintajärjestelmälle, joka on pilvipalveluihin perustuva tietämyksen hallinta järjestelmä, jossa yhdistyvät projektin hallinnan, dokumenttipankin ja prosessihallinnan toiminnallisuudet.

Järjestin työpajoja ja pyysin ammattilaisia jokaisesta liiketoimintadivisioonasta jakamaan omiin vastuualueisiin liittyviä parhaita käytäntöjä. Pyysin osallistujia jakamaan tietämyksensä liittyen tiettyyn tavoitteeseen, joista jalostin myöhemmin 16 aluerakentamisen keskeistä tietämysaluetta.

Keskeinen pitkän aikavälin ratkaisu konsernin aluerakentamisprojektien tietämyksen hallintaan on muodostaa projektihallinnan tietämysmalli. Jotta pystyin muodostamaan tieteellisen perustan tietämysmallille, hyödynsin kirjallisuutta systeemi- ja prosessiajattelusta sekä projektinhallinnasta. Tutkin myös variaatioita aluerakentamisen liiketoimintaympäristöissä ja yleisiä teollisuusalan ja projektijohtamisen parhaita käytäntöjä. Diplomityötä varten toteutin empiirisen tutkimuksen projektiorganisaatioiden nykyisistä käytännöistä sekä keskeisistä eroavaisuuksia hanketyyppien välillä. Lopuksi, analysoin onnistumisia ja haasteita 34 keskeneräisestä tai äskettäin valmistuneesta aluerakentamiskohteesta.

Aluerakentamisen tietämysmalli muodostuu kolmesta prosessijohtamisen ulottuvuudesta: vastuualueet (tekijäulottuvuus), projektivaiheet (aikaulottuvuus) ja tietämysalueet (projektin erillistavoite). Nykyinen projektien prosessijohtamismalli YIT:llä muodostaa pohjan tietämysmallin kahdeksalle vastuualueelle ja kuudelle projektivaiheelle. Yleiset projektihallinnan parhaat käytännöt sekä empiirinen tutkimus ongelma-alueista muodostivat tietämysmalliin sisällytetyt 16 tietämysaluetta. Kaikkein tärkein erityisesti aluerakentamiseen liittyvä tietämysalue on vaiheistuksen hallinta, mikä pyrkii optimoimaan vaihekokoa sekä vaiheiden toteutusjärjestystä ja aloitusajankohtaa.

Jotta voidaan varmistaa tietämyksen hallinnan juurtuminen organisaatioon ja pitkän aikavälin parhaiden käytäntöjen implementaatio ehdotan esitetyn kiinteistökehityksen toimintajärjestelmän DOS:in (Development Operating System) kehittämistä.

Avainsanat Aluerakentaminen, kiinteistökehitys, parhaat käytännöt, tietämyksen hallinta

ACKNOWLEDGEMENTS

Thank you Minea and Lotta. The family is everything. You give me the long-term perspective I'm obsessed with, even though it is not always a good thing in a world where depth perception is limited to three months.

Thank you mum and dad for everything. You are a living example on how hard working is key to success.

Thank you Pekka Helin and Jouko Kemppinen for believing in me and giving me free hands for doing the dissertation. I'm enormously grateful for being able learn form the best.

A special thanks go to Aleksa Pesic for giving me support and always helping me. I owe you so much. You are a great leader.

I also want to thank Juhani Ylitolonen for giving me inspiration. You are a true innovator in YIT, because of your open-mindedness and courage to take risks.

Thank you Milan Murcko. Your business and marketing skills are outstanding. I related to you because we were both relatively new in the industry, event though your life experience is in totally different level.

Thank you Artak Makaryuan for helping me with the thesis. I believe that your great architectural and business skills are a perfect combination in property development business. Thank you also Harri Isoviita, Jukka-Pekka Uusikoski and Alexander Smirnov for answering my questions and requests. Your amount of wisdom and knowledge is admirable.

LIST OF CONTENTS

LIST OF FIGURES AND TABLES

ABBREVIATIONS AND TERMS

Development. The carrying out of building, engineering, mining or other operation in, on, over or under land or the making of any material change of use in any buildings or other land (Jokiniemi & Davies 2012)

Urban planning. Town planning concerned with the nature, structure, and functioning of human collectives in physical space. (Jokiniemi & Davies 2012)

Urban development. The construction of whole areas of a town or city, controlled by planning processes to enhance or improve conditions therein. (Jokiniemi & Davies 2012)

Comprehensive development. The development of a sizeable area of land with buildings or built with associated roads, lighting and other infrastructure, usually as a phased operations (Jokiniemi & Davies 2012)

Residential area development (*aluerakentaminen = area construction*). In English real estate vocabulary, the term area development is rarely used. Often just residential development is used, without any distinction between small and large scale projects. Sometimes terms of neighbourhood and comprehensive development are used. The residential area development in this study has the same meaning as **Comprehensive Residential Development (CRD)** (Author's definition).

Best practices. A good way to organize or execute work. Best practice is a practice that has intuitively or scientifically proven to be valuable or effective within one organization that may have applicability to other organizations (O'dell & Grayson 1998). Best practices are explicit knowledge and able to be shared.

Integrated management system (activity system). An IT system that contains business unit's externalized process information and information tools. (Author's definition) The case company's activity system is established for the requirements of quality management certification.

Project Phase. One of a number of sections of work in a large building development often with its own contractual agreements for design management and construction that arises from splitting up the project to make it more manageable (Jokiniemi & Davies 2012).

Project Stage. One of a series of sections of work in a construction project (Jokiniemi & Davies 2012). In this study, the residential area development projects are divided into 6 stages: Project development, planning, design, pre-production, production and postproduction.

Best living experience. YIT's internal knowledge management program

1 INTRODUCTION

1.1 BACKROUND

This Master's thesis is part of the internal knowledge management project at a Finnish property developer, YIT. The aim of the project is to increase ROI in Comprehensive Residential Development (CRD) projects through increased corporate knowledge. During the project I collected and identified local best practices used by YIT in residential area development. The target of my Master's is to create systemic and long-term model for CRD knowledge management. First I collected and studied local best practices in every business units. Secondly, I created taxonomy or a framework for knowledge management, based on analysis and theoretical framework. Finally, I developed a concept for a Development Operating System, which is cloud based CRD knowledge management system. It is a model for managing best practices continuously, where functions of project management, document repository and process management are integrated.

The YIT carries out residential area development in Finland, Russia, Estonia, Latvia, Lithuania, Slovakia and the Czech Republic. Share of housing is about a quarter of total YIT Corporation revenue and about 60% of all YIT construction revenues. Furthermore, about 60% of housing revenue is from Comprehensive Residential Development (CRD) projects (YIT, 2011). The YIT management have acknowledged the importance of housing in the business portfolio and have established the Best Living Experience (BLE) research and development program, which is a cornerstone for becoming the forerunner in residential property development in Finland, Russia and Central and Eastern Europe. In BLE, there is great emphasis on utilizing the wide international expertise in housing and creating a system for creating, sharing and implementing best practices between subsidiaries. This study is part of the best practices of the residential area development project, which is part of the BLE Shared Concepts and Expertise program. The knowledge and process management project and related training are completed during 2014.

Concrete targets in Area Development Concepts Project are:

1. Improved project return of investment or enhanced financial investment management

2. System of collecting, evaluating and sharing best practices in a CRD process

3. Increased knowledge in urban planning and development processes

In property developer's perspective, CRD projects are important, because of improved return of investment and volume management possibilities. However, Area development is highly complex system, where many stakeholder groups are involved, and political, social, ethical interests affect significantly the project outcome. In regulatory perspective, the planning process aims to ensure economically, environmentally and socially sustainable development of communities. Comprehensive planning is multifaceted co-operation, where strategic planning of authorities, civil activity, political and economic connections, land use politics and environmental conflicts shape the future of an area (Jauhiainen & Niemenmaa 2006). The Goal of this study is to find most important barriers that hinder growth and profitability in CRD business and collect and identify best practices.

Residential development process and tools are mainly focused on a single building development in the case company, although a large portion of housing revenues comes from comprehensive development projects. There are two main reasons why any comprehensive development models have not yet been created. First, the small-scale processes and practices can be applied to a certain extent in a CRD. Second, the comprehensive development projects have been seen as too complex and diverse for systemization.

The term used in Finland for comprehensive development of certain land area is *aluerakentaminen* (area development). According to building dictionary (Jokiniemi & Davies 2012) comprehensive development is defined as an urban development where landowner plans, designs and builds an area and infrastructure. The developer will exchange the infrastructure to building right with the municipality after the development project is completed.

Planners often consider a comprehensive development as an ideal model for urban development. The theory is derived from the belief that quality of the environment enhances if it is planned comprehensively. Therefore, many comprehensive residential and mixed-use developments are initiated by the municipality in Finland. Even in Helsinki many large-scale comprehensively planned areas are currently under development, although all easily developable areas have been already depleted. These projects are mainly mixed-use redevelopments, where developers have little or no participation during the planning phase. Furthermore, as detailed plans are relatively controlled in Finland, the developer has very limited possibilities to enhance the living experience or affordability of the area (Mäenpää et al. 2000)

On the other hand, neoliberal ideals have encouraged developing new arrangements of public–private partnerships in comprehensive urban development. The preliminary cooperation agreements on planning targets and related investments are seen as a way for developers to have a privileged position in urban development. In some cases, public-private partnerships have resulted in overruling of public interest by a developer. This illegitimate use of power, lack of transparency and domination in the market criteria has not eased the initiation of comprehensive planning for developers. (Mäntysalo & Saglie 2010, Mäenpää et al. 2000)

History of CRD initiated by a developer is problematic in Finland. Urban planning and development have faced criticism after many residential areas developed between 50's and 70's are infested with many social problems. These residential areas were developed during rapid urbanization, and general design goal was to develop affordable housing for people moving into cities (Herranen 1997).

In order to make housing affordable developers utilized the prefabricated concrete technology as extensively as possible and little attention was given to the overall attractiveness of the area. To achieve maximum cost effectiveness single developer might develop even more than 10 standardized and similar looking residential buildings in one area. These areas are now generally considered very unattractive (Herranen 1997). On the other hand, the cost efficient development ensured housing for large group of workers that moved to the urban areas.

It was already known in 1950's at least in Helsinki that large-scale affordable housing development might lead to social problems, but need for housing was high. The large-scale affordable housing projects were considered as a temporary solution for the acute need of housing for labour force that immigrated to cities. Buildings' life span was originally designed for 30 years (Herranen 1997). Still, negative connotations have been attached to the concept of residential area development and developers are seen responsible for problematic suburban areas.

Residential development is highly regulated In Finland. Conversely, in Russia, where the case company has it most growth potential, there are more degrees of freedoms to achieve possibilities in developers point of view. Bureaucracy, infrastructure and complex endorsement procedures result in a significant amount of uncertainties, but developers have more possibilities to create areas for the best living experience and vice versa (Tynkkynen 2006).

Changes in operational and competitive environment cause organizations to constantly rethink and redesign their value adding systems. The comprehensive change is a consequence of global competition, developments in information and communication technology, global warming, depletion of natural resources, increased productivity demands and changes in demographics and consumer culture. (Laamanen & Tinnilä 2009)

Changing business environment incentivises property developers to be more socially and environmentally responsible together with brand awareness. This, in turn, creates a demand for customer-oriented and holistic residential development process. The paradigm change in urban development is that the interests of authorities, customers and developers are aligned. In other words, developers' interest is to take into account customer needs and long-term impacts of the project. Contrary to the general belief, interest-orientated planning and development process shorten the project life cycle. This is because of the reduced number of appeals (Pesic 2010).

Changing business environment also causes projects to be more complex. Advancements in technology and social structures increase the complexity of the system of the residential area development. For instance, there is increased need to take into account services in early

phases of a development project. There is no reason to believe that planning and development environments will be less complex in the future. More complicated business models and increased public-private-people –partnerships will cause significant pressure to redesign urban planning and development processes (Majamaa 2008).

For ensuring the well-managed and profitable growth in increasingly complex business environments, I need to find systemic ways for collecting, identifying, refining and implementing companywide best practices. I need to create the model for enhancing the knowledge and process management practices and tool for continuous improvement of competitiveness and adaptation to changes in business environments in many geographical locations.

1.2 RESEARCH QUESTION

In YIT, there is well-established and efficient housing development process. However, the problem is that the current housing process and tools are not optimal for comprehensive development projects, where project management is more complex process. The standard large-scale housing development projects from plot acquisition to handover are usually carried out without any explicit knowledge of the case company's best practices. Furthermore, the level of experience and capabilities in comprehensive development varies significantly between business units. Therefore, highest success potential in large-scale area development projects is not achieved within the case company.

There is plenty of tacit knowledge related to comprehensive residential development in YIT. However, the knowledge is scattered across business divisions, units and departments. The case company's best practices in important aspects such as plot acquisition, special planning, design management, master planning and phasing are yet to be collected, stored and shared.

Therefore, the first research question is:

1. What are the case organization's best practices in Comprehensive Residential Development that can be applied to every business environment?

Secondly, the best practices related to responsibility areas identified during workshops and interviews are categorized into key knowledge areas. This will create a hypothesis for the second research question:

2. What are the key knowledge areas in Comprehensive Residential Development process?

Finally, based on theory and organizational research I will describe the knowledge framework of CRD. The framework will improve organization ability to identify, collect, categorize and distribute best practices, which will in turn improve quality and reduce costs and risks. In order to make implementation of best practices more efficient and ensure long-term development of processes, I created a prototypical tool for knowledge, process and project management to be developed in the future. I call it development operating system or DOS that can be used for a passive process and knowledge management tool or for an active training and project management tool. These suggestions will create a hypothesis for the third research question:

3. How to continuously implement best practices into unified Comprehensive Residential Development process?

1.3 AIMS AND LIMITATIONS OF THE STUDY

The main aim is to create comprehensive housing development process framework to be applied in YIT subsidiaries. The process framework is based on existing investment level housing process and best practices identified during the study. The study focuses on plot acquisition and draft design phases. Furthermore, the focus of this study is on projects that have at least three separate construction phases and the developer have had influence on urban planning. The sub-aims are as follows:

To review (a) the literature about the best practices of comprehensive housing development processes, (b) to review current comprehensive housing development process in YIT (c) to compile a framework of the relevant best practices.

To describe (d) the residential development related processes in YIT's business divisions , (e) to investigate and benchmark examples of past realizations of comprehensive development projects in YIT and to interview process managers and arrange workshops, (f) to gain understanding of problem areas in comprehensive housing development process and find best practices related to these problem areas.

To choose and link (g) the best practices with YIT ICS and CSF processes, sub-processes, and phases as well as to test the most relevant best practices by interviewing (h) the managers and/or (i) planning a pilot project.

To specify (j) the framework and its application for inclusive CRD knowledge and process management.

1.4 CONDUCT OF THE STUDY

The first part of the study was conducted by performing a literature review about the available best practices and application methods in comprehensive housing development process. The study was made by key-word search in electronic library, journal and internet resources. Other sources of material consisted of YIT's internal material, previous cases of comprehensive development projects, and site visits. Based on the review, best practices framework and their key characteristics are summarized in key aspects –tables. The tables were the basis for assessing the applicability of the reviewed practices in YIT comprehensive development processes.

From the literature review, the general classifications of real estate development processes were understood. For the study, I divided the processes into four responsibility areas based on current YIT International construction services housing process. The work related to responsibility areas is focused on a certain project stage, but there are required activities during the whole project. The development process is simplified to the following four core responsibility areas:

1. Plot acquisition

2. Planning and design

3. Construction/Procurement

4. Sales and Marketing

We arranged about one workshop in month, totalling to 13 workshops. Representatives from 6 divisions participated to the workshops: Central and Eastern Europe, St. Petersburg, Moscow region, Moscow and Russian regions, Residential Construction Finland and Building Construction Finland. Also, some other specialists participated to the workshop, depending on the topic.

The first workshop was in October 2012, and the goal was to understand the key factors in successful CRD projects. There were need to know how to achieve forerunner status in CRD, how to achieve successful area brand, and what are the realistic and the concrete targets for the shared best practices project.

For the second workshop, I asked participants to create information package from the all on-going or lately finished comprehensive development projects and present them. In the first workshop, we had defined that collected comprehensive development project should have at least three separate buildings. I had certain model information package that defined what information and knowledge should be collected and presented from the project. Collecting the information also demanded significant amount of work, because of complexities in information systems. In other words, I had to digitize great amount of information from project folders.

During the second workshop, the division representatives presented the some of the 31 ongoing or lately finished comprehensive development projects. During the presentations, I started to identify certain problem areas and some best practices that should be implemented to the comprehensive development model.

Next four workshops we focused on the core processes of the housing development. For the each of these workshops, I prepared set of questions and a presentation template to gather good practices that have been used in divisions. The representatives coordinated the discussions and internal workshops in the divisions to answer these questions. In the

workshops, the representatives presented the practices that they believed to be valuable to comprehensive development concept.

During the final workshops, we tested the developed comprehensive residential development concept that can be implemented to all divisions. The developed concept is based on the information and the knowledge of the generally applicable good practices gathered from the previous workshops. We also tested the applicability of the comprehensive housing development risk management and evaluation tools.

In order to improve understanding of current housing development processes in the case company, many interviews were conducted in response to particular information needs. Interviews were multidisciplinary and were targeted to various levels of the organization.

After these steps, incorporation of the best practices and YIT current housing development processes will be initiated. The training will be organized during spring 2014. However, the development of estimation, knowledge and process management tools for CRD process will be continued after this report is finished.

1.5 STRUCTURE OF THE REPORT

In Chapter 1 reader is introduced to why comprehensive housing development processes needs redesigning. Key research questions, main and sub-aims and the conduct, methods and data of the study are also presented.

In Chapter 2, the results of the literature review are presented in terms of knowledge management and best practices, process management and comprehensive housing development. Finally, chapter introduces the framework of best practises in comprehensive housing development process. The chapter covers sub-aims (a), (b),(c)

In Chapter 3, the current YIT comprehensive housing development processes are analysed, best practises of comprehensive housing development processes are investigated, and the results of interviews are presented. The chapter covers sub-aims (d), (e) and (f).

In Chapter 4, there are suggestions for the further adoption of the best practises for comprehensive housing development process in YIT. The chapter covers sub-aims (g), (h), (i) and (j).

In Chapter 5, the results of the study are summarized, and critique of the study is presented. Also, the Recommendations for future research are presented in the final chapter.

2 THEORETICAL FRAMEWORK

2.1 CONDUCT OF THE LITERATURE REVIEW

In the literature review, there are three key areas in advancing the comprehensive housing development process in the context of this study. First key area is system thinking, where the goal is to understand the field of urban development as a system. Second key area is process management, which increases understanding of the interconnected processes in the project delivery system. Third key area is knowledge management and the concept of best practice. Knowledge management is a theoretical framework of how organizations learn. The best practices are know-how, knowledge or experience that has proven to be valuable within one organization and may have value to other organizations (O'Dell & Grayson, 1998).

The field of knowledge management grants us tools that help us manage the knowledge gathered during the study, and based on this knowledge create a process model that enables continuous learning and improvement in business of CRD. The final key area is a comprehensive development process. In this area, focus is on how the comprehensive housing development process has been structured in other studies and what the industry best practices according to the literature are. In this study, I'm focusing on the theoretical framework of knowledge creation and implementation instead of knowledge management systems.

Finally, I briefly reviewed the concepts of process management and system thinking. Areas of process management and the system thinking emphasize the holistic approach on value production. These fields of science support the goal in creating a framework for future

knowledge management of residential development and creating the holistic approach to customer oriented process development.

This theoretical framework enabled us to identify and refine useful knowledge and put it into practice through process management and system thinking. In the figure 1 the CRD system is illustrated. In the figure there are two subsequent CRD projects. A plot and other resources are physical inputs to the project. Regulatory, customer and technology information are non-physical inputs to the project. The circle in the middle illustrates the project management process where the inputs are refined to outputs, which are residential area, profit and knowledge. As the knowledge in the process management, regulatory environment, customer needs and technology possibilities increases the enhanced outputs can be achieved with the lower inputs.

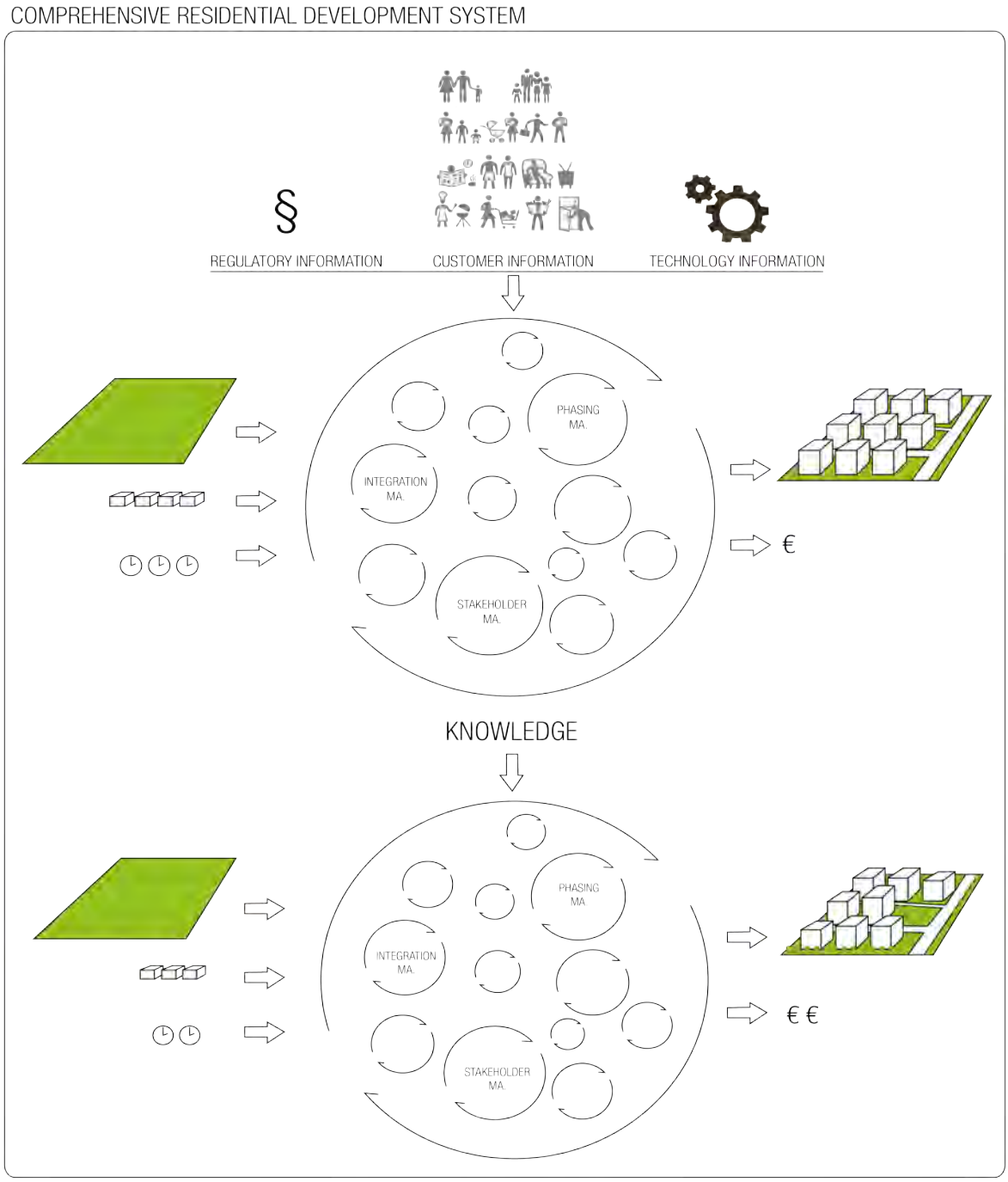

Figure 1: The Theoretical framework

The literature review was conducted by a key-word search through literature and online resources. Used keywords were comprehensive development, knowledge management, best practices, process management, system thinking, and urban planning. Some of the knowledge

and process management sources are from well-known authors as Nonaka (1994, 1995, 1998, 2000) and Porter (1985).

As the master's thesis is part of the larger multi-disciplinary and complex process development project, it has been essential to pay extra attention to the theoretical framework. Furthermore, the goal is to achieve a comprehensive understanding about underlying logic behind property development processes, and how other organizational processes support the complex, but repetitive development process. Also, the goal of the Master's thesis is to create knowledge management framework for the Best Living Experience development project, which will continue after this study. In order to achieve the comprehensive understanding of large-scale residential development business, which is necessary in creating the framework, substantial effort is invested to the theoretical framework.

2.2 SYSTEM THINKING

Urban development is always complex system (Ratcliffe et al. 2004). In order to make lasting improvements to comprehensive housing development processes, we need to understand it holistically. In order to understand and communicate urban development holistically, the application of system theories is needed. Human is incapable to understand complex interactions per se, but has to break them down to partial decompositions (Simon 1997). System thinking is one approach to finding those partial decompositions and understanding their interactions.

In this study, focus is on property developer's perspective on urban development. However, there is a need to understand interests and processes of related institutions like planning authorities, governments, markets and homebuyers. System theories give us tools to connect all institutional interests and processes to urban development context. Systems theory is a framework for gaining more understanding of the behavior of complex social and natural systems, such as urban development (Senge, 1992).

Open systems are more relevant to the real world studies than closed systems that rarely exist (Robson, 2002). Publication of general systems theory was a fundamental point in development of the field of science. The publication changed the focus from closed systems to open systems (Bertalanffy, 1951). Natural open systems are defined as a mechanism that

exchanges matter and energy with interrelated systems. In social open systems matter and energy are replaced with information and communication for creating order. Defining factor for systems is also the subjective borders of the system with its interdependent parts and complexity. (Mäntysalo, 2000).

Outside the given open system exists its environment which can be called either an ecosystem or society (Mäntysalo, 2000). Organized complex systems, such as ecosystems, cities or companies, can be defined by their nonlinearity rather than simple input-output linearity. Nonlinearity is the result of the fact that complex open systems are time and space dependent; replicating complex system to another time and space is considered as impossible (Wilson, 2006). In other words, the relationship between a system and its environment is constantly changing (Mäntysalo, 2000).

The characterization of problems in modern society is changed from general societal problems to synthesis of political, economic, religious, technological, environmental and legal problems – and this "inescapable narrowness of vision" was, essentially, the main problem of modern society (Mäntysalo, 2000). The interactions between stakeholders are as important as the stakeholders themselves in social systems. (Luhmann, 1995). Often, still deeper understanding of stakeholders' needs and their interactions in the system is neglected, when solving complex problems and enhancing system efficiency.

For the improvement of system efficiency, constant learning is critical. Furthermore, learning is only possible by feedback loops (Innes & Booher, 2010) and the self-recognition, viewing the system and its boundaries from the inside, are critical for learning among the actors in the system. Therefore, a system must contain enough self-description to recognize itself and be separated from its more complex environment (Luhmann, 1995). Learning in systems is understood as two overlapping loops. The first loop brings new approaches to the challenge that a system aims to solve. The second loop enables restructuring of the problem itself (Innes & Booher, 2010).

Various application of system thinking in urban development has been suggested. For instance, Doak and Karadimitriou (2007) have also adapted a systems view of development, although they focused on commercial development and at a highly conceptual level.

Furthermore, urban development systems can be seen as institutional systems. According to Mäntysalo (2000), there are administrative, economic, and political activity systems in urban development. The administrative subsystem is set between Public and Private, economic between Private and People, and political between People and Public.

Institutional models emphasize the organizations involved more than individuals. The institutional models in property development overlap event-sequence models, agency models and production-based approaches. Recently, researchers have strived to understand the larger institutional system of the development process (Guy & Henneberry, 2002).

Another example of application of system thinking in urban development is to examine urban development's product energy and material inputs and outputs. Ayres (1994) used the analogy of metabolism in this context. This approach concentrates on the flows of the functional system, for example, what the system takes from outside its borders, and what it returns back. This view of regarding a system as inputs and outputs has often been used in process thinking.

2.3 PROCESS THINKING

Most things we do in business and in life are processes. Great processes deliver consistent, quality outputs in a timely, efficient and effective manner. The outputs are only a result of the activities in the process; what we do, and the inputs; the information, materials and services we use (Wisner & Stanley 2007).

In this chapter, the processes as part of the organization are defined. The core processes of every successful organization are examined and case enterprise is comprehended as a group of interconnected and constantly improving processes.

2.3.1 PROCESS DEFINITION

Process is a tool for transforming information and creating value (Kruus 2008). Foundation for process thinking is a chain of functions that enable organizations to produce value to the customers (Laamanen & Tinnilä 2009). Traditionally organizations have pursued to create value within separate departments, and main focus has been on managers and their job

description. This functional departmentalization has numerous drawbacks. Main problems are in department target setting and organization interfaces. Target setting is a problem because targets are too focused on short-term key figures of department performance, such as turnaround time and performance related to budget. This short-term performance monitoring does not take into account needs of customers, long-term research, development and innovation of products and services and improvements in customer relationships. Moreover, problems in organizational interfaces emerge, when there is a need for collaboration between departments or companies. These factors contribute to the ability to adapt customer needs and to deliver competitively innovative services and products (Laamanen 2001).

Preceding problems caused by functional organization structure are quite common, and the three most popular solutions to this problem are teams, outsourcing, and processes. Team working is contradictory to the manager-oriented departments, because in target setting, distribution of work, changes in operations and reporting are controlled among the team members without the manager. Advantages of teamwork are empowerment and enhanced speed, flexibility and innovativeness caused by self-direction. Outsourcing means that organization focuses to core competencies and procures necessary supporting services from other organizations. Drivers for outsourcing can be the need for lowering costs, substandard quality of internal service or changing operational environment that leads to new needs that the organization is unable to meet (Laamanen 2001).

However, many risks are related to concepts of teamwork and outsourcing. These risks can be mitigated with organizational process framework. Moreover, salient to the process thinking is to increase value to the customer with improving organizational performance. When process starts and ends to customer, all organizational interfaces are connected to the customer and organization can deliver value comprehensively. In conclusion, purpose of process thinking is to understand holistically how organizations function as a value delivery system and how to improve it. (Laamanen 2001)

Process as a concept includes five key aspects (Laamanen 2001):

1. operation,

2. operational resources,
3. produced value,
4. benchmarking and
5. feedback

Similarly, project can be defined as a unique realization of process (Kiistala 2007). On the other hand, Project Management Body of Knowledge (PMBOK) (2008) defines a project as a temporary endeavor undertaken to create a unique product, service or result. PMBOK also emphasizes that although there is underlying well-studied process in development projects, this repetition does not change the fundamental uniqueness of the project work. However, in order to find and utilize best practices throughout the company we need to expand perspective from management of unique projects to understanding project as a replicable process. The project management process has to deliver optimal output with adapting to the unique set of inputs.

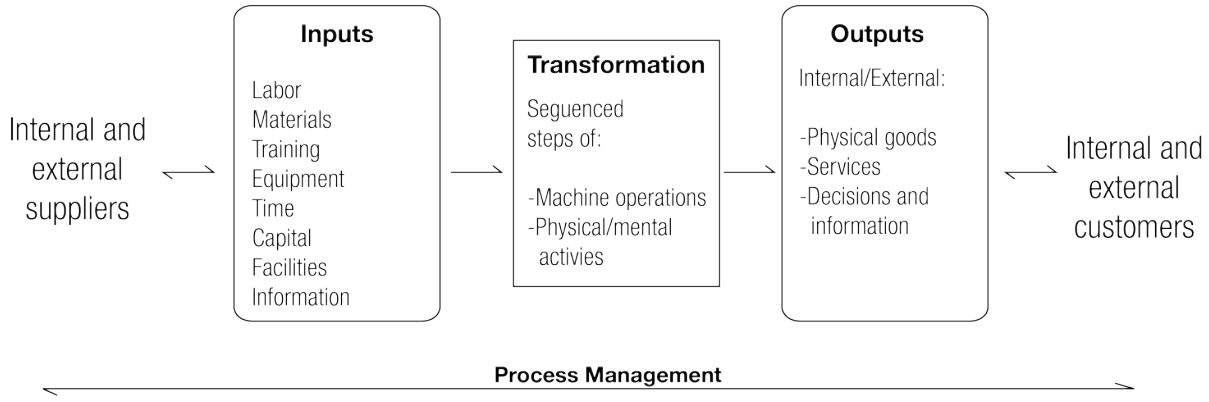

Figure 2: Generic process elements (Source: PMBOK 5th ed.)

2.3.2 ASPECTS OF BUSINESS PROCESS MANAGEMENT

There are many approaches to the corporate process management. In this study, I chose to view process management from several perspectives instead of just one standardized theory. Therefore, we selected one corporate process management compilation to be the main reference to this section. According to Laamanen and Tinnilä (2009), the authors of the

compilation, objectives of the corporate process management do not essentially differ from the general objectives of the management. General objectives of management are:

1. Profitability
2. Customer satisfaction
3. Productivity
4. Personnel activity, motivation and discipline

(Laamanen & Tinnilä 2009)

In corporate process management, attention is on direct action: instead of cost efficiency emphasis is on speed and flexibility and comprehensive organizational collaboration and customer orientation is more important than personal goals. In addition, creating and developing stronger partnerships in value networks are essential in process management. (Laamanen & Tinnilä 2009)

Main tasks of process management are to recognize the chain of actions and functions in value production, create process model, benchmark it and set targets for its development. A process manager has to ensure that value is created sufficiently in proportion to the resources used in a process. (Laamanen & Tinnilä 2009)

Concept of process management in organizations can be understood holistically when analyzing it from various perspectives. The figure 3 illustrates the approaches to the corporate process management more closely.

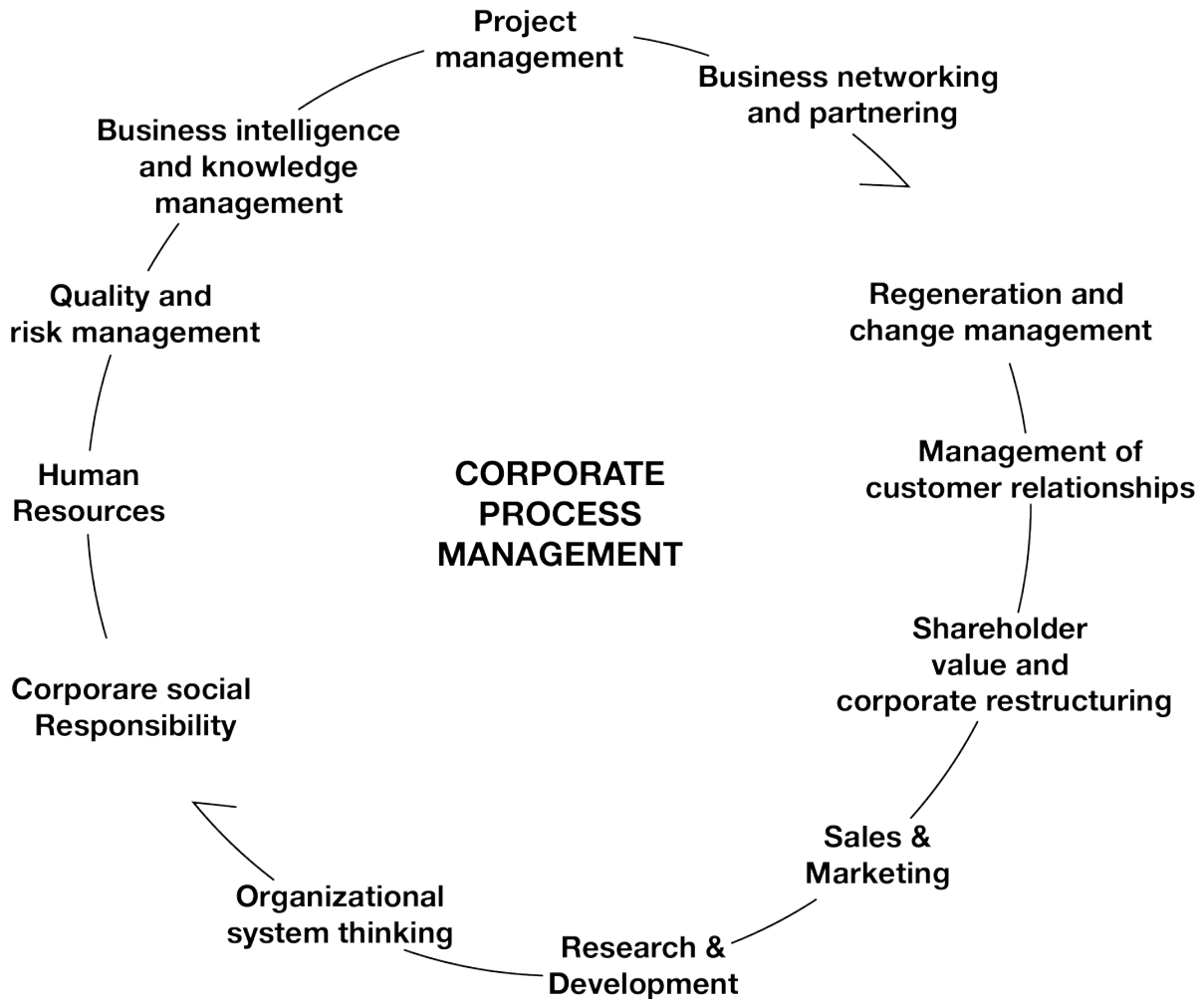

Figure 3: Approaches to process management (modified from: Laamanen & Tinnilä 2009)

Shareholder value and corporate restructuring.

Incremental change of ownership and financial markets has caused a situation, where institutional investors have replaced individual owners. Consequently, as corporate culture is more profit oriented, shareholder management is more important to the process management. Synergies or concentration to the core business is the main strategy for achieving competitiveness and creating shareholder value. (Laamanen & Tinnilä 2009)

Management of customer relationships

Enduring customer relationships and enhanced competitiveness requires customer orientation. It enables long-term relationships and enhanced value creation. Needless to say, the customer orientation is essential in process thinking. Customer-oriented organizations seek to understand what are the customer needs, how to create value and how align interests and processes so that the value creation is maximized. Basis for enduring customer relationship is communication, and it can be achieved by effective internal and external communication in every stage of the interaction process. (Ventovuori et al. 2002)

Research & Development

Product development process aims to meet faster and better the customer needs. Therefore, it is very important for the competitiveness of the company. Product development process highly interconnected to the other processes of the organization. Development of processes and organizational structures in a company is also part of development of products and services process group.

Sales and marketing

Purpose of marketing is to acquire new customers and reinforce exciting customer relationship and inform all customers about the value proposition of offered products and services. Purpose of sales is to finalize the value interaction with customers whose interest has been aroused with marketing. It is important for sales to reduce risks related to purchase and to remove all obstacles to a sale.

Project management

Processes are executed and developed through projects. On the other hand, it is important to emphasize that the organizational processes enable collaboration and learning between projects. Collaboration and learning between projects is essential for incremental improvement of project management process.

Quality and risk management

In this context quality management is understood as process that ensures product or service to meet its implicit or explicit requirements just in time. There are two kinds of risks: strategic

and operational. Strategic risks are related to organization's competitive position in the market, partnerships and changes in social and natural environments. Operational risks are related to processes, products, services, execution, practices, safety and critical knowledge. Risk management is a process, where probabilities and effects of risk realization are analyzed, and plans for risk prevention and response are created.

Business intelligence and knowledge management

Business intelligence is a process, where organization collects, maintains, and organizes data. This produces large amounts of information that can help develop new opportunities. Identifying these opportunities and implementing an effective strategy can provide a competitive market advantage and long-term stability. Purpose of knowledge management is to identify, create, represent, distribute, and enable adoption of insights and experiences (see chapter 2.4.1).

Human resource management

Human knowledge, prowess and motivation are always unique, and at the same time they are essential for the every organizational process. Therefore, successful human resources management enables every other organizational process to function in its highest capacity. Role of human resources is changing widely from administrative to more strategic role in the organization as its importance for long-term competitiveness is acknowledged. The responsibilities of human resource management include the attraction, selection, training, assessment, and rewarding of employees. Furthermore, additional responsibilities are overseeing organizational leadership and culture, and ensuring compliance with employment and labour laws.

Business networking and partnering

Networking and partnering of organizations and employees enhances interconnected value creation and, therefore, competitiveness. The objective of business networking and partnering process is to create possibilities for other processes to exceed organizational boundaries and achieve flexibly with time and cost efficiency. Challenge in partnering is to consolidate the interests of every networked organization and to achieve equality in outcome sharing.

Corporate social responsibility

Corporate social responsibility is a process with the aim to embrace responsibility for the company's actions and encourage a positive impact through its activities on the environment, consumers, employees, communities, stakeholders and all other members of the public sphere who may also be considered as stakeholders. Private business can be sustainable only when its operations are profitable. However, private business has started to react to societal pressure and started to focus on more long-term profit maximization. Furthermore, corporate social responsibility is reported to have positive immediate impact as waste has been reduced, and ethical consumerism has increased competitiveness.

Organizational system thinking

Organization creates either economic or social value. The organization's value creation is achieved by arranging physical and immaterial capital optimally in the interactive and reactive system. System thinking seeks these optimal arrangements of capital by understanding the interconnections of the processes, which prevents organization to operate counter-productively to its goals. Significance of organizational system thinking is emphasized during changes in the operational environment or internal practices. Process is one approach to understand organizational operation as a system, and this understanding can be utilized in the creation of incrementally improving and innovative system architecture.

Regeneration and change management

Only lasting competitive advantage for every organization is the ability to learn and develop faster than the competition. Organizational learning, continuous improvement of operations and innovation necessitates changes in mind-set and attitudes and systemic analysis of the information. Therefore, successful process management requires transformation-focused change management.

2.3.3 PROJECT MANAGEMENT PROCESS (PMBOK)

The target of this thesis is to create a framework for structuring best practices in Comprehensive Residential Development. Residential development is project-based business.

Therefore, natural approach is to structure best practices into general project management knowledge areas. Most comprehensive framework for project management is described in Project Management Body of Knowledge (PMBOK) by Project Management Institute. The project management processes, knowledge areas and practices in PMBOK are widely established across industries (PMBOK 2013).

In PMBOK, the project is divided into process groups and management areas. In this chapter, we will learn how the PMBOK project management system is structured. Later, the same structuring in the management of CRD projects is implement (PMBOK 2013).

Some management practices introduced in PMBOK are structured differently in the case company. For instance, following knowledge areas are included into the activity system: Design Management, Communication Management, Marketing Management, and Safety Management. All knowledge areas in PMBOK are included in some way or another to these four management areas. Furthermore, as the residential development projects are relatively similar with each other, the management system is more process-oriented and needs less planning than PMBOK framework suggests, where all project information is externalized and documented. However, the PMBOK might reveal some management knowledge areas and practices that can be organized more efficiently or some key areas that need more attention in CRD.

The PMBOK Guide takes the best approach for purposes of teaching the subject content of each knowledge area, but is not so effective when it comes to providing guidance for running a particular project. Furthermore, in describing a project, the Guide explains, "Projects are often implemented as a means of achieving an organization’s strategic plan" and "Projects are undertaken at all levels of the organization." The Guide is mainly written from this perspective throughout, that is to say, from the project owner's perspective rather than from that of a supplier or seller. (Wideman 2003) Most importantly the PMBOK will provide us the terminology that is applied in many industries internationally; the identified best practices can be categorized in a way that is easily understood. Additionally, the CRD projects are more complex than small-scale infill development projects. Therefore, the need for systemic analysis of the whole development process is necessary. The PMBOK process groups and management areas are explained in Appendix 1.

2.4 KNOWLEDGE MANAGEMENT

2.4.1 OWERVIEW OF KNOWLEDGE MANAGEMENT

There are as many definition of knowledge management (KM) as there are researchers. However, one of the most comprehensive definitions has been written by William R. King in Knowledge Management and Organizational Learning (2009): "Knowledge management is the planning, organizing, motivating, and controlling of people, processes and systems in the organization to ensure that its knowledge-related assets are improved and effectively employed. Knowledge-related assets include knowledge in the form of printed documents such as patents and manuals, knowledge stored in electronic repositories such as a "best-practices" database, employees' knowledge about the best way to do their jobs, knowledge that is held by teams who have been working on focused problems and knowledge that is embedded"

We need knowledge management because it focuses on knowledge processes – knowledge creation, acquisition, refinement, storage, transfer, sharing and utilization and these processes support organizational processes involving innovation, individual learning, collective learning and collaborative decision-making. Other benefits of KM are improved organizational decisions, activities, products, services, processes and relationships that enable the organization to improve its overall performance (King 2009).

The Primary and renowned theoretical knowledge management model this study is based on is Nonaka & Takeuchi's SECI model which describes how knowledge is created. The SECI model is extended to a knowledge management process model by William R. King (2009), and it is studied in order to gain understanding how it can be interconnected to the comprehensive development process model. The typologies of knowledge are also examined.

As the goal of the Master's thesis is to find best practices in comprehensive housing development, we will focus more on theories behind best practices that have been adapted from other relevant and related literature.

2.4.2 TYPOLOGY OF KNOWLEDGE

Knowledge of the workers creates an organization. Therefore, gaining an understanding of what types of knowledge exist within an organization may allow us to foster social structures that will enable and support learning in every organization.

In their book The Knowledge-creating Company, How Japanese Companies create the Dynamics of Innovation (1995), Nonaka and Takeuchi define knowledge as either tacit or explicit. Sometimes types of knowledge have been categorized also as: implicit and explicit. Authors usually use implicit knowledge when they mean tacit knowledge and vice versa. However, there is a subtle difference between Implicit Knowledge and Tacit Knowledge. It is presumed that Implicit Knowledge has not yet been codified but that it likely can be codified while tacit knowledge may well be impossible to codify (Liebowitz 1999). To serve the purposes of this study I expanded Polanyi's (1967) typologies with Tywoniak's (2007) categories of personal and common knowledge (see table 1).

Table 1: Selected chronology of organizational knowledge typologies (Canary 2010)

Author	Categories
Polanyi (1967)	Explicit knowledge Tacit knowledge
Collins (1993) *__Blacker__ (1995)	Embodied Embrained Encultured Encoded *Embedded
Spender (1996)	Conscious Objectified Automatic Collective
cook & Brown (1999) *__Tywoniak__ (2007)	Explicit Tacit Individual/*personal Group/*common
Boer(2005)	S-knowledge (subject) R-knowledge (rule) M-Knowledge (meditating artefact) O-knowledge (object) A-Knowledge (involved actors) D-Knowledge (decision of labour)
*indicates revisions to typology and author providing revisions	

Tacit Knowledge and Explicit knowledge

"Tacit knowledge is personal, context-specific, and, therefore, hard to formalize and communicate" (Nonaka & Takeuchi 1995). Put differently, the tacit knowledge is one's own personal knowledge, or experience. Tacit knowledge is always personal, and its expression through language is often difficult because it is often shaped by knowledge owners' personality, experience and intuition (Koskinen et al. 2003).

According to Awad and Ghaziri (2004) the tacit knowledge is the most valuable type of knowledge even though is it is hard to formalize and communicate. Without personal tacit

knowledge, corporate knowledge cannot exist. Therefore, it is valuable to convert tacit knowledge into explicit corporate knowledge and capture it in the form of best practices.

In short, this sentence is explicit knowledge about explicit knowledge. Certainly, Awad and Ghaziri (2004) have expressed it better: "Explicit Knowledge is knowledge codified and digitized, for example, in books, documents reports, white papers, spreadsheets, memos and databases". In short, explicit knowledge resembles more information or descriptive data than tacit knowledge. Furthermore, explicit knowledge stands for factual statements about the environment and it can be easily expressed in words and numbers. Therefore, explicit knowledge is easily transferred and shared within an organization.

Tacit Knowledge	Explicit Knowledge
Subjective and based on experiences (body)	Objective and rational (mind)
Hard to express in words	Can be expressed in words
Beliefs, ideas, mental structures, feelings, expertise and know-how	Theoretical knowledge, solutions, guide books and information packages
Hard to transfer	Transferable
Skills, habits, values	Facts, events, references
Simultaneous knowledge (here and now)	Sequential knowledge (there and then)
Analog knowledge (practice)	Digital knowledge (theory)

Table 2: Two types of Knowledge (Nonaka & Takeuchi 1995)

2.4.3 THE KNOWLEDGE MANAGEMENT PROCESS

According to King (2009) the knowledge management process directly improves other organizational processes, such as development of new products and services and project management. Further these improved organizational processes produce intermediate outcomes such as better decisions, organizational behaviors, products, services and relationships. These, in turn, lead to improved organizational performance, because of improved innovation, collaborative decision-making, and individual and collective learning.

Figure 2 presents a process cycle model of KM created by King (2009). Such cycle models provide a useful way to organize one's thinking about KM processes in a larger context. There are numerous KM processes cycle models that describe the relationships of the key processes of KM, ranging from Davenport and Prusak's (2000) 3-stage model ("Generate, Codify/Coordinate, Transfer") to Ward and Aurum's (2004) 7-stage ("Create, Acquire, Identify, Adapt, Organize, Distribute, Apply"). The King's (2009) process cycle model is valuable because it uses the accepted terminology of KM and makes use of alternative paths in order to make important distinctions. The knowledge management process model illustrated in Figure 4 shows that the inputs to the KM cycle are either the creation or the acquisition of knowledge by an organization, and the process output is an improved organizational performance.

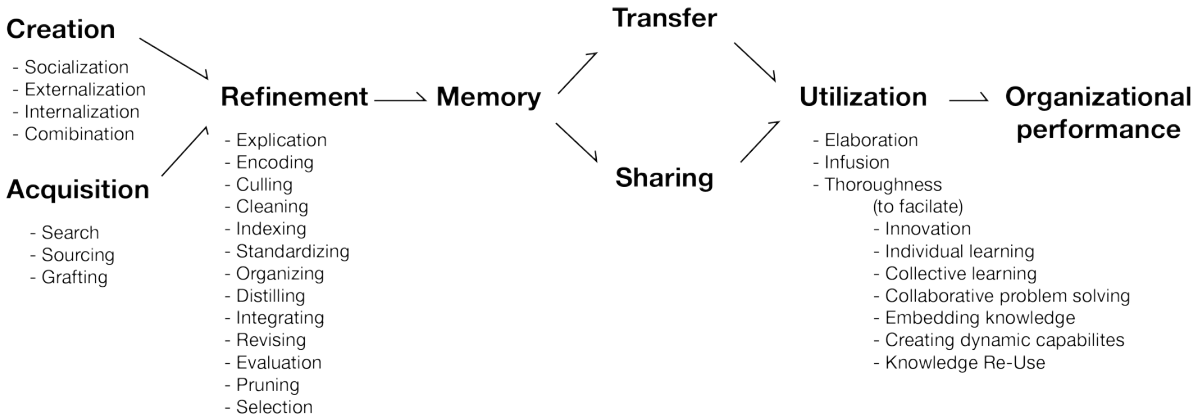

Figure 4: Knowledge management process model (King 2009)

Knowledge creation

The first stage in knowledge management process is knowledge creation, where new knowledge is developed or replaced with new content (Nonaka & Takeuchi, 1995). The focus of this is usually on knowledge creation inside the boundary of the firm or in conjunction with partners. The four bullet points under "Creation" refer to Nonaka & Takeuchi's (1995) the SECI model (see next chapter).

Knowledge acquisition

Contrary to knowledge creation, knowledge acquisition is the search for, recognition of, and incorporation of potentially valuable knowledge outside the organization (Huber, 1991). The bullet points under "Acquisition" demonstrate some processes for acquiring knowledge from outside the organization – searching, for instance on the Internet (Menon and Pfeffer, 2003), sourcing, which means the selection of the source to use (King and Lekse, 2006) and grafting, which stands for acquisition of personnel that have desired knowledge (Huber, 1991).

Knowledge refinement

Contrary to knowledge creation, knowledge acquisition is the search for, recognition of, and incorporation of potentially valuable knowledge outside the organization (Huber, 1991). The bullet points under "Acquisition" demonstrate some processes for acquiring knowledge from outside the organization – searching, for instance on the Internet (Menon and Pfeffer, 2003), sourcing, which means the selection of the source to use (King and Lekse, 2006) and grafting, which stands for acquisition of personnel that have desired knowledge (Huber, 1991).

Memory

Organizational memory includes knowledge stored in electronic repositories, minds of organizational participants and the business's processes, products or services and in its relationships with customers, partners and suppliers (Cross and Baird, 2000).

Transfer and sharing

In the fourth stage in knowledge management process knowledge is transferred or shared. Transfer and sharing may be conceptualized as two ends of a scale. Transfer is more focused and purposeful communication of knowledge from a sender to a known receiver (King, 2006a). However, sharing is less-focused distribution, such as through a repository, to people who are often unknown to the contributor (King, 2006b).

Utilization

In the sixth stage knowledge is utilized through elaboration, infusion and thoroughness (King and Ko, 2001) in order to amplify innovation, collective learning, individual learning, and/or collaborative problem solving. The first one, elaboration, is the development of different interpretations. Infusion, in turn, is the identification of underlying issues, and thoroughness is the development of multiple understandings by different individuals or groups (King, 2005). It may also be embedded in the systems, processes, practices, products and relationships of the organization (Levitt and March, 1988).

THE SECI MODEL

The SECI (Socialization, Externalization, Combination and Internalization) model is probably most cited theoretical framework in the field of knowledge management. Nonaka and Takeuchi (1995) describe how knowledge is created and converted between tacit and explicit knowledge. In every conversion cycle tacit and explicit knowledge grows in quality and quantity creating an upward spiral of the knowledge creation (Figure 5).

Nonaka & Konno (1998) also sought an answer to the question where the knowledge is created. They created a concept of ba, which roughly translates into

the English word place. Every phase of SECI model embodies its own ba and purpose of it is to create optimal conditions of knowledge creation and learning.

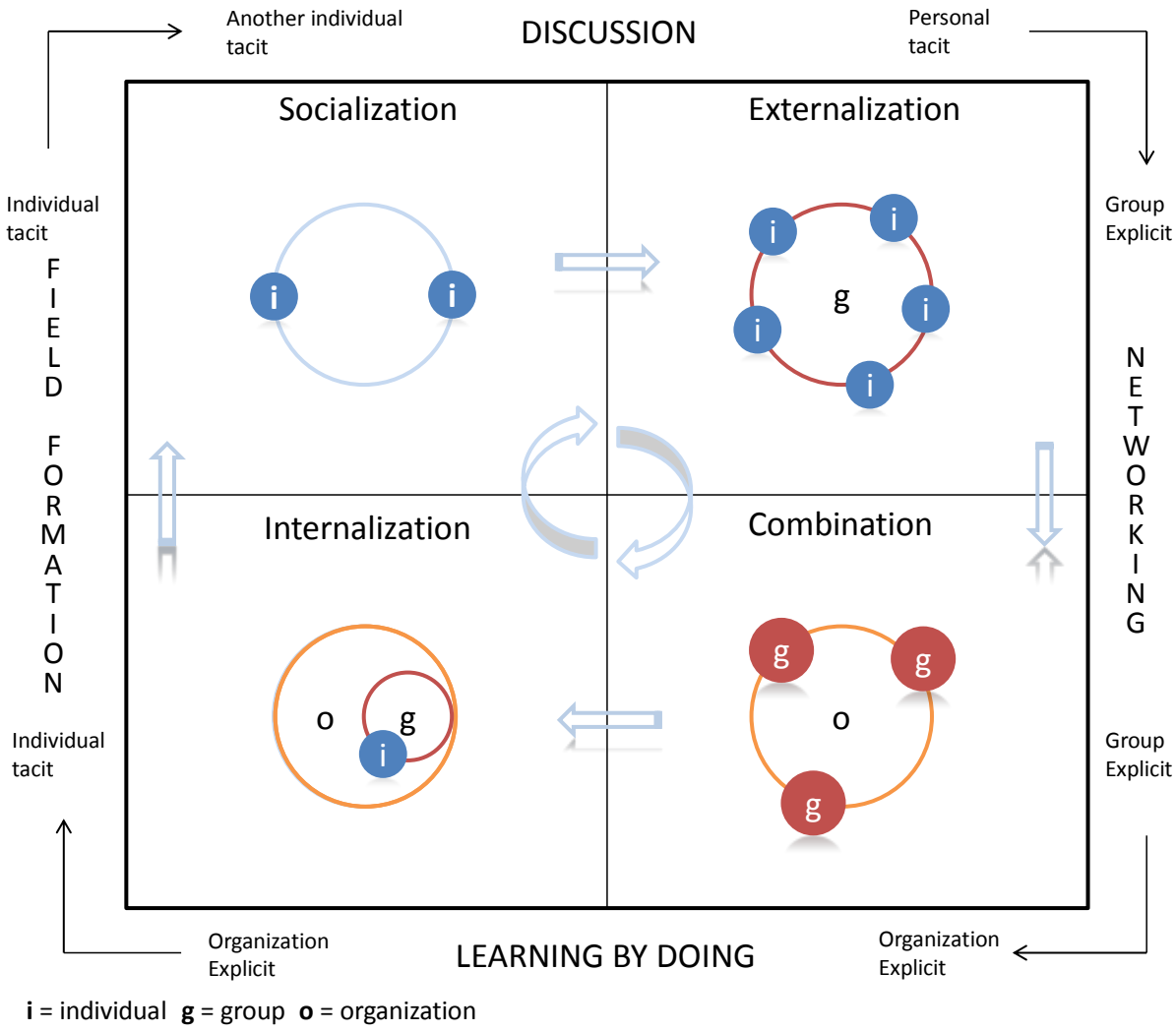

Figure 5 : The SECI process (modified from Nonaka & Takuchi 1995)

Socialization

In the first stage of SECI loop, individuals shares experiences and learn from each other with and without communication by perceiving, imitating and practicing. In addition to practices, individuals learn an industry and organizational models, norms, culture and values. Furthermore, individual specifies and defines the existing concepts and even creates novel

concepts during socialization. The socialization stage usually starts with the building of a field interaction. (Nonaka & Takeuchi 1995)

Externalization

In the second stage of SECI model tacit knowledge transforms to explicit knowledge in group discussions. The tacit knowledge is articulated with accurate concepts and transformed into the words. The expression of the tacit knowledge in a comprehensible form is often the most difficult part in the knowledge creation process. The two key factors are needed for externalization. First, tacit knowledge is converted into explicit knowledge in articulation between individuals, and conventional techniques such as words, concepts, figurative language and visuals are used. The second factor involves translating this articulated knowledge into a readily understandable form. (Nonaka & Konno 1998)

Combination

In this phase, the core issues are communication and diffusion processes and the systemization of knowledge (Nonaka & Konno 1998). According to Nonaka and Takeuchi (1995) in combination phase expressed explicit information is transformed into more complex and systematic explicit information. In other words, the existing internal or external knowledge is combined, adapted and transformed into new knowledge. Moreover, the new knowledge is shared and transformed throughout the organization and combined with existing knowledge in order to create new processes and practices. Usually organizations utilize data systems in this phase to organize and systemize the knowledge combination and sharing.

The combination phase in SECI model is the most relevant for this study; goal of the Master's thesis is to combine the externalized best practices of CRD from the YIT subsidiaries, which is the essence of the combination phase.

Internalization

The final phase of the cycle is the internalization phase where newly created explicit knowledge is converted into the organization's tacit knowledge. (Nonaka & Konno 1998).

2.4.4 KNOWLEDGE MANAGEMENT PRACTICES

Robinson et al. (2005) have created a knowledge management maturity roadmap (STEPS) for benchmarking and developing knowledge management practices in large construction companies. The maturity road map was originally developed based on case studies on large construction companies in UK. The roadmap attempts to address the key obstacles in sustainable adaptation of knowledge management in an organization. The roadmap is also flexible enough as organizations have different needs for the knowledge.

The five stages in knowledge management maturity roadmap are Start-up, Take-off, Expansion, Progression, and sustaining. The roadmap demonstrates the various stages of implementation of knowledge management. The attributes related to the steps mirror the key issues in knowledge management such as the need to recognize the necessity for reform, awareness of the advantage of knowledge sharing and the necessity for a result monitoring system to evaluate the performance impact of knowledge management. The STEPS framework enables companies to improve their position from low to high within the stage if they meet the attribute's requirements.

Organizations at the first stage, the start-up stage, can be characterized by having some awareness of the benefits of knowledge management. The understanding of the significance of knowledge sharing and its applications to the business development is increasing. For organizations at the sustainable stage, the knowledge management is normal routine and is adopted in the entire organization as it evolves an essential part of the organizational culture, business processes, employees' behaviour, and research and development (Robinson et al. 2005):

In implementing knowledge management successfully, organizations should consider the need to develop a strategy which clearly defines the objectives of knowledge management

implementation. Often, resources, including a management support and budget are neglected in an organization, even though it is essential for the success of knowledge management implementation. Furthermore, it is important to recognize that necessary change such as organizational culture needs to be addressed in order to facilitate knowledge management implementation (Al-Ghassani et al. 2002). It is also essential that the knowledge management strategy is supported by both IT and non-IT tools. IT tools address the explicit knowledge component of knowledge management whereas non-IT tools address the tacit knowledge component. Moreover, knowledge management should be linked to existing performance measures, and enabling organizations to objectively benchmark their knowledge management implementation efforts internally and externally (Robinson et al. 2005).

2.5 COMPREHENSIVE RESIDENTIAL DEVELOPMENT PROCESS

Urban Planning and comprehensive development are two sides of the same coin; the two different approaches to the development of built environment. In this chapter, I describe the dualistic nature of the urban development and the collaborative planning model, where a property developer has a possibility to influence the urban planning through collaboration with planning authorities.

Although this study includes practices in Eastern Europe and Russia, this chapter focuses on Finnish planning and development processes. Key differences in planning and development practices between Finland and other YIT operation countries will be examined in chapter 3.7. The urban development processes and practices vary from country to country, and not all practices in literature can be applied to the case company comprehensive development model. However, in this chapter non-Finnish reader can achieve understanding of the background and terminology of the selected approach to the CRD.

2.5.1 THE URBAN DEVELOPMENT PROCESS

The urban development process is, on one hand, a continuum for the built environment as a whole and, on the other hand, a project with clear spatial boundaries. Although, urban development in general is continuous, an urban development process is temporal; it has a start and end (Kuronen 2011). Furthermore, the urban development process is shaped by

history, technology, economy and local cultures. It is always evolving complex system (Rathcliffe et al 2004).

After the Second World War and during the accelerating urbanization there was a high need for housing in Finland, and in order to meet this demand governments often resorted to resources of private developers. Consequently, private companies developed masses of housing estates Finland during 1960's. Furthermore, this raised an ocean of criticism towards urban development that did not meet societal norms, and it led to the situation, where planning authorities has almost a total control on urban development (Jauhiainen & Niemenmaa 2006). However, the prerequisite for successful CRD projects is collaboration between private and public actors. Now, fortunately Land Use and Building Act provides for a developer and other stakeholders more possibilities to collaborate in the planning stage. Therefore, in practice the greatest obstacle for public-private-partnerships in urban planning is traditions and customs (Maijala 2007a).

In contrast to urban planning, interest of CRD is economical rather than social or ecological. However, as developer's interest is to maximize value production for a customer, a homebuyer mostly, the interests of planning authorities, developers and people are usually aligned. The problem is in finding a perfect balance between short-term and long-term goals of urban development. Collaboration is the key in finding this balance. In other words, the collaboration ensures people to have the right apartment in the right area at the right price. Furthermore, the apartment, and the area support the sustainable social, economic and ecological development of the urban area (Ahlava et al. 2007a).

Property development is always unique, but CRD can be standardized to a certain extent. By recognizing the reoccurring practices in the underlying processes, we can identify the variables that are changing from project to project (Wilkinson & Reed 2008). The process creates new information in every new project situation to the every member of project organization. Therefore, value creation process can be understood as dynamic learning process (Mäkynen 2007c). Every process is initiated by the identified needs of customer. It does not matter if a customer is the receiver of the final product or the co-creator in the

process. However, it does matter that information flow is well managed, and needs are well known between all stakeholders (Mäkynen 2007a))

2.5.2 URBAN PLANNING

Land-use planning is the most important tool for authorities to control urban development. However, municipal building by-laws (rakennusjärjestys), land-use and housing politics and local building control influence greatly urban development (Jauhiainen & Niemenmaa 2006). Planning process can be described as authority-initiated juridical process that is guided by general societal needs (Ahlava et al. 2007a).

Planning in Finland is hierarchal process: general land-use plans and regulations are used as a mandatory starting point for more detailed plans (figure 6). The Land Use and Building Act which came into force in 2000, display three types of the development plan: the regional plan (maakuntakaava), the master plan (yleiskaava) at the citywide or district level, and site specific detailed plan (asemakaava)(Jauhiainen & Niemenmaa 2006).

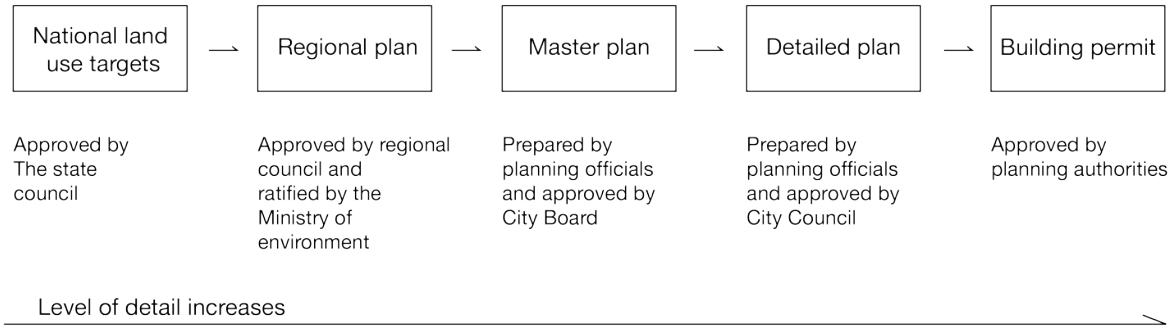

Figure 6: Hierarchical system of land use planning in Finland (Jauhiainen & Niemenmaa 2006)

According to Land-use and Building Act a municipal planning process is transparent, public and interactive process, where planners, citizenry, private enterprises, municipal authorities and local government are participating. Democratic land-use planning is ensured with the local council, municipal executive board and land-use planning board. The law is giving a

framework for the planning process but is not narrowly regulating the content of the land-use plans (Jauhiainen & Niemenmaa 2006).

The regional plan is prepared by the Regional Council. The regional plan includes structural guidelines that are legally binding. The general plans are ratified by the Ministry of the environment. The Ministry expects that the local development strategy should generally compliment the regional plan.

The general plan covers typically the entire city. It is in essence a land-use zoning map designating land areas to five categories (Jauhiainen & Niemenmaa 2006):

1. Mixed uses
2. Housing
3. Commercial
4. Public utilities and technical services
5. Recreation and parks.

City planning authorities may also prepare a local plan which bridges the gap between the detailed plan and the master plan. The local plan outlines the land uses development area and overall character, green areas, primary road network and transport connections, essential local services such as nurseries, schools, libraries and local commercial facilities. Furthermore, the local plan determines the overall scale of development e.g. block layouts, maximum floor area and parking requirements. The local plan is often used with the case of planning new neighbourhood areas owned by the City (Hakkola 2007c).

The detailed plan varies from a general zoning document to mandatory and highly detailed urban development guideline. Within Finnish planning, this is considered to be the main urban development controlling tool (Hakkola 2007c). Only a detailed plan has the legal authorization to establish development on a site or to change the land-use designation, although the master plan can determine land-use changes for larger areas (Jauhiainen & Niemenmaa 2006).

A detailed plan has to conform broadly to the policies and goals enclosed within the master plan of the city. The statutory master plan controls the detailed planning. Since the City is the local planning authority making the decisions at the detailed plan level, the City has the right to make exemptions if there are any special reasons for doing so. It is Department of City Planning which directs the preparation of the master plan and local and detailed plans (Jauhiainen & Niemenmaa 2006). The land use and building act mandates the planning process and for instance requires that public participation and impact assessment is conducted in a certain extend (Land Use and Building Act Sections 6§, 9§ and 62§).

In developing new residential area, the planning process follows the standard procedure. At first the process is going through the draft planning before proceeding to the proposed detailed planning stage. During draft planning specific planning conditions are assessed, such as the height of buildings, housing layouts, internal courtyards, internal arrangements; maximum density, permitted plot ratio and housing mix. Usually, the architect-planners have various planning instruments to control the surrounding environment. (Gordon & Lindroos 2012)

During detailed planning process, the environmental design guidelines (Rakentamistapaohje tai Katu ja puistoalueiden yleissuunnitelma) may be prepared by the city planners. The guidelines provide additional technical support for ensuring that the planning aims and conditions contained in the detailed plan are achieved. Furthermore, the design guidelines might specify some central features that have to be followed in respect of the building plot overall. The guiding programme includes texts (descriptions, objectives) and illustrative drawings, specifying the details the developer must follow when implementing the plan. Both City Planning and Building Committee have to approve environmental design guidelines after the detailed plan has been approved. (Gordon & Lindroos 2012)

If the city owns the land qualitative competitions (competitive tendering) tend to be the norm for land allocation, especially in Helsinki. However, it should be stated that there are various methods for land allocation, and there are many forms of competitions. In a competitive land allocation procedure, the successful developer will be selected upon the basis of the architectural quality of the competition proposals and tendered price (Gordon & Lindroos 2012).

In all cases - both in competitions and in direct commissions - the designs of houses or residential blocks must be carried out in coordination with the special group of City officials who oversee the implementation of the developments. This group must agree the designs which have to be in accord with the detailed plan and the environmental design guidelines. A further point to note is that if a developer's proposal for a residential block conforms to the approved planning conditions set out in the detailed plan and the environmental design guidelines in all aspects they may go straight to the next stage in the process, that of gaining a building permit from the Building Control Department.

If the developed land is privately owned, a local authority may enter into land use agreements about planning and implementing plans (maankäyttösopimus). However, land use agreements cannot be bound to the content of a plan. A land use agreement that is binding the parties to the agreement can be completed only after the draft plan or proposal has been publicized. This does not apply to agreements to initiate planning. Furthermore, land use agreements may well be used to agree more broadly on the mutual obligations and rights of the parties to the agreement. A land use agreement is intended to be publicized in conjunction with drawing up the plan. (Land Use and Building Act Section 91 b)

When developed land is privately owned, obligatory costs are usually occurring to both the developers and local authorities. The land use and development compensations are also determined in Land Use and Building Act. The preparation and processing of the detailed plan, alteration of the plan or land division into separate plots that are initiated by the general public or the landowner's proposal authorize municipalities to collect compensation (Land Use and Building Act Sections 59 § and 82 §). Furthermore, the landowner who benefits the value increase of developed land has an obligation to contribute to the costs of infrastructure development (Land Use and Building Act Section 91a §). However, the maximum land use compensation is 60 percent of the realized value increase of the developed land (Land Use and Building Act Section 91f §).

Costs related to urban planning and infrastructure development can be also covered with development compensation procedure (kehittämiskorvausmenettely), where landowner assigns part of the planned building right to municipality (Land Use and Building Act Section

91c §). Development compensation procedure is only viable if the binding land or block layout plan is shown in a detailed plan (Land Use and Building Act Section 91g §).

Costs related to urban planning and infrastructure development in the developed area consist of procurement, planning and construction of roads, parks and other public areas. Additionally, land use and development compensation scheme might include soil improvements, noise protection and planning costs. Municipalities should implement the measures that were described in a compensation scheme at latest 10 years after coming into effect (Land Use and Building Act Section 91d §). However, municipalities have an obligation to compensate the negative effects of implementing the detailed plan (Land Use and Building Act Section 106 §)

2.5.3 COLLABORATIVE PLANNING PROCESS

Nature of traditional urban development process is discontinuous. In other words, value creation processes of urban planning and property development are misaligned; there is no communication between planning authorities and developers during the planning process. To address this problem Väyrynen and Smeds have proposed a continuous development model, where collaboration between planners and development is ensured from the very beginning (figure 8). In collaborative planning model, there are no discontinuations between conception, planning, design, construction and occupation phases. Also, the knowledge created in collaborative development project can be utilized in consequent plans.

In collaborative planning model, the official planning process is integrated to the core development process, which allows partnerships between public, private and people (4P). In short, 4P –model is an extended version of public-private-partnerships, where people and their needs are better integrated to the urban development process. If people are able to contribute to the development process, 4P-model will result in satisfaction of all stakeholders (Majamaa 2008).

The result of collaborative planning process is not just a plan, but the documents, drawings and other material that can be utilized during later stages e.g. design and maintenance. Contrary to the traditional planning model, in collaborative planning there are multiple

simultaneous processes that transforms information between all actors. Therefore, it is important to use suitable tools for quality management in every stage in the process and to assign active project manager for the whole project (Väyrynen & Smeds 2009).

It is critical that the actors involved in collaborative planning process are committed from the very beginning, when a concept for the area is developed. The goals that make possible concrete and innovative solutions are developed as the concept is developed. The collaborative planning model helps to ensure that developed ideas and concepts are guiding the whole development process and the concepts are aligned with the goals of all actors. (Väyrynen & Smeds 2009)

Prerequisite for successful collaborative planning is active coordination and positive attitude towards changing the conventions. Furthermore, prerequisite for efficient coordination of multi-levelled planning and design process is open collaboration (Soudunsaari 2007a). The collaborative planning model offers possibilities for planners to increase resources for planning and design management. Moreover, well-managed design process has substantially enhanced possibilities to achieve social, ecological and economical goals of the project (Meronen 1997).

2.5.4 PROPERTY DEVELOPMENT PROCESS

There is a variety of views on and categorizations of the development process. Property development can be related to industrial production process that involves the combination of various inputs to the process and outputs from the process. In property development, the output is a change of land use or a new or altered building in a process that combines land, materials, labor and finance. However, property development process is a complex entity. The end product is unique either in terms of its physical characteristics and/or its location. Moreover, no other process operates under such public attention (Wilkinson & Reed 2008).

Next I will describe the underlying processes of property development. Often development process is a continuous process, and there are no real stages of development. For instance, the process of building design is present during almost the entire development process. However,

dividing the development to the stages and sub-processes helps to comprehend the whole process (Rathcliffe & Stubbs 2004).

Initiation

Planning is top-down hierarchal process, and if development is initiated by developers the process is more bottom-up (Närhi & Pakarinen 2007). Residential development is initiated when either parcel of land or site is considered suitable for more intensive residential use, or if demand for housing leads to a search for a suitable site. Initiator of urban development can be any actor or stakeholder, but in CRD initiation is usually from a developer or a landowner. Even though the CRD can be theoretically initiated by planning authorities, this rarely happens. The governmental policies are to do minimum necessary to enable the private sector to participate in development (Wilkinson & Reed 2008). Usually planning authorities conduct a city plan just as a typical planning process without developer's input, which usually result in a wasteful plan alteration process (Ahlava et al. 2007a).

Concept

Successful concept includes reliable evaluation of potential earnings in relation to risks and uncertainties. However, successful developers are those who are able to differentiate with innovations and controlled risk taking, even though they only have the same information as competitors. The initial evaluation includes also market analyses of supply and demand and targets for schedule, scope and costs (Rathcliffe & Stubbs 2004).

Evaluation

Plot evaluation stage is critical for the developers' decision-making process. It includes initial market research, and acquisition terms and the financial appraisal of the proposal (Reed 2007). Plot evaluation should be undertaken before committing to the plot. Although the plot evaluation involves the combined advice of the developers' professional team, the responsibility of commitment rests fully with the developer. Evaluation is a continuous

process with constant monitoring, relating directly to all the other stages (Wilkinson & Reed 2008).

Acquisition

Before the acquisition, there should be a wide variety of information gathered and many decisions made. These should include the Legal investigation, Ground investigation and Finance (Wilkinson & Reed 2008). At the latest in the acquisition phase developers should initiate communication and collaboration with all stakeholders. Neglected communication will probably result in difficulties and delays in the development process (Rathcliffe & Stubbs 2004).

Design & costing

Design is also continuous process running parallel with the various other processes, getting progressively more detailed as the development proposal increases in certainty (Wilkinson & Reed 2008). In addition to the knowledge of design and construction, project management is required to have knowledge about the development process decisions and implementation. Formation of competent design team is important and should not be neglected. Design process should be well monitored and coordinated. Also during design and costing phase communication and collaboration with stakeholders should be active (Rathcliffe & Stubbs 2004).

Agreements and construction

Throughout this stage, the underlying goal is to make certain the development is completed within both time and budget stated in the evaluation, without compromising quality. Usually this is best achieved by employing a project manager to coordinate the design and building process. The project management must control the risk in order to minimize extra delays and costs. Furthermore, the project manager should be as active as possible in promotion and market monitoring in order to ensure product-market fit (Wilkinson & Reed 2008).

Marketing, sales and handover

Marketing of the development is also continuous process. It is important during conception stage, when target market and potential customers are determined. Prerequisite for successful marketing is conducting thorough plan for market research, communication and advertisement (Wilkinson & Reed 2008). Sales represent the culmination of the development team's entire efforts. It requires the developer to take a broad view of marketing. First, the process includes analysis and design to meet customer needs. Second stage is to assemble an integrated sales effort to convince the target market that the product meets its needs. Finally, project team develops a feedback loop so that customers' reactions can be used for repositioning the product and the sales effort regularly (Miles et al. 2007).

3 ORGANIZANITON STATUS

3.1 CONDUCT OF THE PROCESS ANALYSIS AND THE APPLICABILITY ASSESSMENT

Chapter 3 provides basic information of the case company's comprehensive residential area development processes. In this chapter, I will present the current status of the portfolio, process, project and knowledge management, which I have researched with interviews and investigating past examples of comprehensive development projects. The analysis consisted of 3 steps. In step 1, the current organizational and project management processes were analysed and described. In step 2, I studied the past examples of comprehensive development processes in order to discover current experience that the organization has been able to gather in this area. In step 3, I interviewed the managers in order to discover the key differences in development processes in the residential area development and small-scale infill development. Furthermore, the empirical research included comprehension and description of key differences in the case company's business environments.

3.2 CURRENT HOUSING BUSINESS PROCESSES (PRACTICES)

Goal of this study is to share best practices concerning comprehensive residential area development within the case company. Therefore, it is necessary to understand variations of housing processes between divisions as the processes are formed out of best practices.

Case company practices residential area development in the following countries through subsidiaries: Finland, Russia, Estonia, Latvia, Lithuania, Slovakia and the Czech Republic. The subsidiaries are divided into six divisions. In Finland, there are two divisions under Construction Service Finland (CSF) segment: Residential Construction (RC) that operates in southern Finland and Building Construction (BC) that controls the other part of the country. Furthermore, International Construction Services (ICS) have 4 operational divisions. In Russia, there are three divisions: St. Petersburg (ICSP), Moscow Region (ICMR) and Moscow and Russian Regions (ICRU). Finally, the Central Eastern Europe (ICEE) division includes subsidiaries in Estonia, Latvia, Lithuania, Slovakia and the Czech Republic.

Business segments have similar underlying processes for housing development, but there are some key differences. So far there is no unified model for housing development process, but need for some level of unification has been acknowledged and is under development. The underlying housing development processes are mostly tacit knowledge within organizations, but some level of externalization has been conducted for needs of process development and quality management. However, level of process externalization differs widely between divisions and subsidiaries.

If the site has ratified plan, the housing development process is relatively simple, and need for a full externalization of the development process is minimal. However, comprehensive residential area development projects are more complex and unified model for the overall process is seen as beneficial.

In addition to the internal change of best practices, overall processes in divisions are also shaped by industrial best practices and local business environment. Moreover, subsidiaries are mostly acquired, and old practices further differentiate the development processes.

There are two levels of housing production processes in case company depending on viewpoints. In ICS, the first level of housing process management or housing project management is carried out by the project team, and the focus is on four parallel processes (figure 7): plot acquisition, design management, construction and procurement management, and sales and price management. For instance, outline of design management process

consists of plot utilization plan, project plan, and draft design, main drawings design, working drawings, supervision and finally documentation.

The housing project management is influenced strongly by second level of housing process management, which is also known as investment process. During the investment process, the housing board aims to control and monitor local project management for ensuring that strategic targets are met, and risks are mitigated. In ICS, the gate model ensures (figure 7) that before any financial commitment the project is systemically evaluated so that the project has prospects of succeeding financially. The gate model also ensures that some of the best practices are used during the development process as it is required in the investment terms.

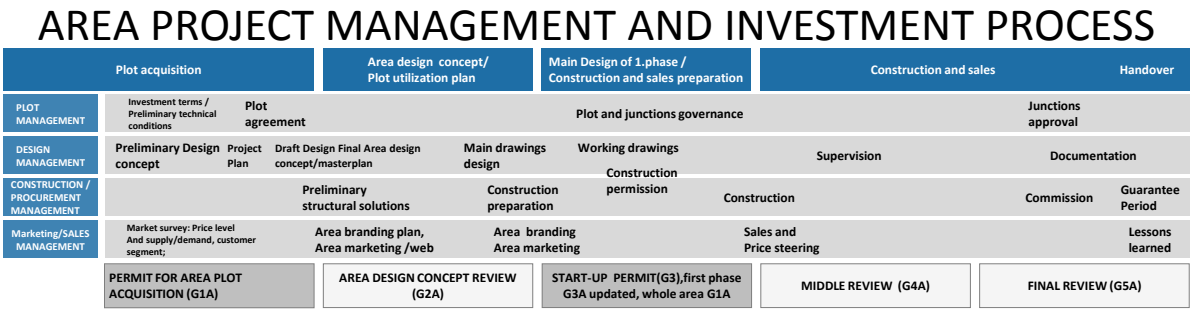

Figure 7: Area project management and investment process outline (edited from Kemppinen 2013)

ICS has highly unified segment and division level investment process, but subsidiaries have varying practices on how project initiated, planned and executed. Furthermore, there has been some systemic sharing of best practices of housing development between subsidiaries, but adoption level differs significantly.

ICS has highly unified segment and division level investment process, but subsidiaries have varying practices of how project is initiated, planned and executed. Furthermore, there has been some systemic sharing of best practices of housing development between subsidiaries, but adoption level differs significantly.

CSF, on the other hand, has a lesser degree of standardization in control and monitoring process between divisions, but this is because process management practices are more similar between business divisions and units. In CSF, they use common activity system which is also known as Integrated Management System. The system supports sharing and adoption of

practices. Activity system also helps organize the process so that information tools and operational instructions are easily found. Furthermore, there are many same housing development practices among divisions. For instance, profitability tests mainly follow the standard model.

The activity system or integrated management system (Figure 8) is the main knowledge management system within CSF. The new knowledge is transformed into new tools and instructions that are integrated in process model in the activity system. There are some information systems, where project data and knowledge are stored in digital form, but the information is relatively unorganized for straightforward analysis. The integration of new ICT systems e.g. Enterprise Resource Planning (ERB) systems, Building Information Modelling (BIM) systems and Knowledge Management (KM) systems are currently under development.

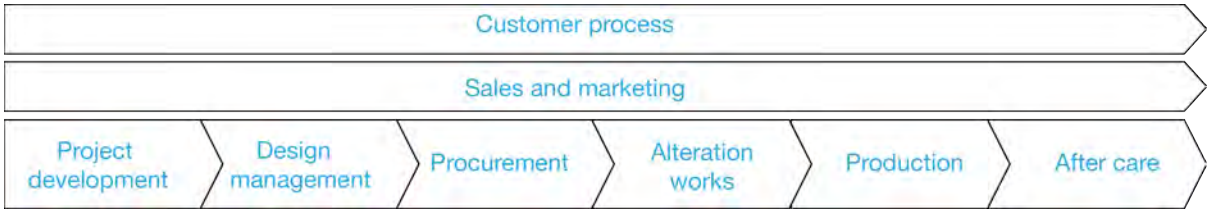

Figure 8: Internal activity system or integrated management system

In activity system, the housing development process is divided into three main processes: customer process, sales and marketing and project management process. The customer process describes different phases that a single customer goes through before, during and after an apartment purchase. Furthermore, sales and marketing process is divided into four stages: market research, preliminary marketing, sales and marketing, and after-marketing. Finally, residential development process has six overlapping subprocesses or functional areas: plot acquisition, design management, procurement, alteration works, construction and handover. For instance plot acquisition process has two stages: initiation and plot acquisition. The residential development business units in residential construction business division are organized as strong matrix organizations. Every functional area team has managers and several related specialists. Responsible specialists from every functional department form a project team for a project.

Housing development process is in the intersection of project management and process management; the housing project is always unique, but the development process is similar from project to project and so-called information tools are developed for the repetitive tasks. Tools are not just used to straightforward information flow and calculations, but they are also important aspect of controlling and monitoring processes. For example, the profitability test tool allows managers to evaluate the cost and returns of particular design solutions.

3.2.1 PROJECT DEVELOPMENT PROCESS

In the case company, the project development process has been separated to the two sub-processes; the initiation and the plot acquisition. The project development process in comprehensive residential development projects is relatively case-oriented as there has been little or no systemization of the overall process. Interviewed plot acquisition professionals stated that there were too many variables and too few large-scale site acquisitions for single business units to be feasible to develop an explicit process model. However, there is underlying implicit process that ensures inflow of competitive plots for development and reduces risks related to the acquisition. Implicit knowledge includes following aspects of practices in plot acquisition: gaining acquisition leads, initiation of plot acquisition, cooperation with landowner, negotiations, stakeholder management, plot screening, portfolio management, correct formulation of plot requirements, sharing and delivery of notification, attendance to plot auctions and procurement of preliminary designs for project calculations.

Acquiring leads for plot purchases is essential for successful plot acquisition process. Both primary and secondary markets are important sources of development leads, but often developer's initiation might lead to successful plot acquisition. In Russia, primary sources of land are federal and municipal auctions, but a large portion of developed plots is from secondary markets. Efficient acquisition of leads for area development often necessitates good reputation of the developer and good interpersonal communication strategy with landowners. Best outcomes in plot acquisition have been achieved when speculative developer and landowner formed formal or informal partnerships. In the figure 9, sources of

land are visualized as leads entering a funnel, which will eventually filter out the unfeasible plots.

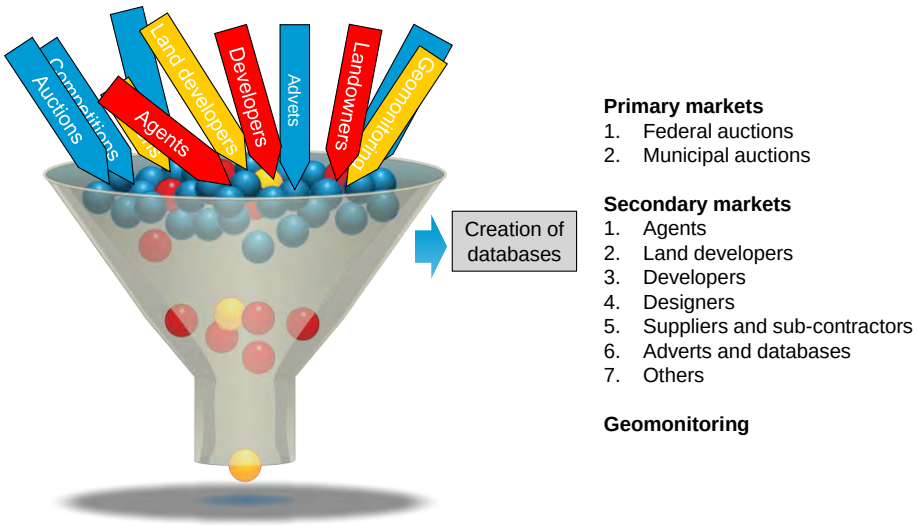

Figure 9: Plot acquisition funnel (Edited from: Artak Makaryan)

Obtainment of a development lead initiates the plot acquisition process where unfeasible plots are eliminated from the process before increasing level of commitment. At first, the plots have to meet the developer's criteria of development. In the case company, there are certain financial, location and allocation targets that need to be met before creating a development concept for the plot. Based on potential customer segments in the area the most feasible concept for the plot is created. Simultaneously, more serious negotiations are held with the landowner. If the negotiations are successful, technical and juridical due diligences are practiced in order to manage risks related to plot acquisition.

In Russia, where most of the case company's residential development projects are comprehensive development projects, the complicated development approval process, junction arrangement and design regulations together with social infrastructure obligations have to be taken into account during plot acquisition process. Often risk and obligations related to a plot are too high making the development unfeasible.

Finally, the investment board authorizes the plot purchase if the financial estimations meet the case company's targets, the project fit into housing portfolio and the risks are controllable. Thereafter, the corresponding business unit's representative sings the contracts with the landowner.

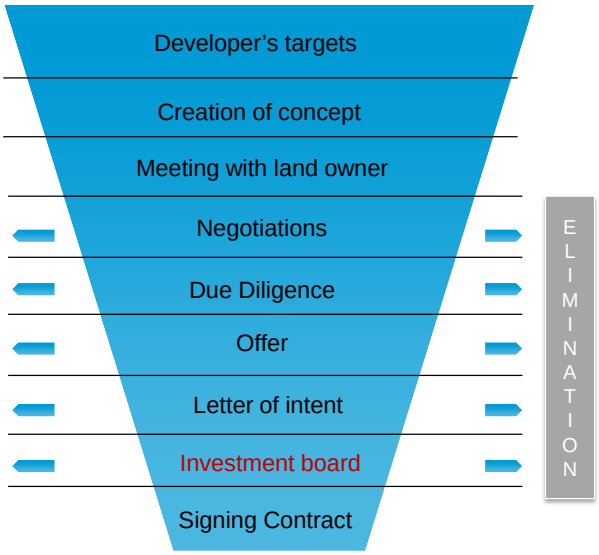

Figure 10: Plot acquisition process (edited from Artak Makaryan)

As it has been mentioned before, there is hierarchical approval process that ensures business profitability through plot acquisition. In the case company, there are six key aspects of information that need to be gathered and processed prior to the purchase decision:

1. General project information:

- Location and surroundings: location, services, transportation
- Planning scope: building right, number of stories, car parking and other requirements
- Junctions: energy, water, IC-lines and drainage conditions and cost estimations

2. Constructability:

- Juridical constructability: ownership, planning allocation, planning situation, permissions, easements, rights and natural conservation
- Technical constructability: load bearing capacity, access, soil contamination, archaeological remains, geological faults, made-up ground, underground services and underground tanks
- Abnormal factors influencing construction

3. Market analysis:

- Market and competitive situation in the area
- Price level and customer segments in the area: new and existing apartments

4. Schedule

- Planning, permissions, phasing and commencements

5. Project finance:

- Building right targets: area of sellable apartments and business premises, number of sellable car parking and storage
- Plot price, terms of payment, turnover, profit, cash flow, stage and form of agreements, land-use payments and other terms and agreements
- Project quality targets: design solutions, design requirements, quality level, methods of construction, abnormal design targets, spatial plan
- Sales tactics: starting price, sales speed, value allocation, price increase

6. Risk evaluation

- Building right, schedule, cost, sales price and market risks

- Measures to lower risks

Cost and profitability estimations, maps, visualizations, drawing and other material that are based on preceding information will be attached to the plot acquisition application.

3.2.2 DESIGN MANAGEMENT PROCESS

Currently YIT CSF has following design management sub processes:

1. Project planning for plot acquisition
2. Draft design procurement for initial feasibility study
3. Main drawings procurement for project feasibility study and building permit
4. Construction drawing procurement
5. Construction preparation
6. Juridical and financial preparation before construction
7. Project management during construction
8. Handover

Design management ensures that urban design will produce maximal return of investment in a particular plot. Currently, in the case company the design management process group includes explicitly following management knowledge areas: integration, scope, cost, time, quality (design quality), procurement (design work), communication, risk and communication management.

After the contracts have been signed with the landowner, the project manager assumes the leading role from plot acquisition manager. At first, the project manager assembles the project team that will bring the project to the handover. In large-scale comprehensive development project, an effective integration management is crucial for the success of the project. The

project design management team includes also construction manager, project engineer, procurement engineer and customer customization engineer.

In the project-planning phase, the project manager forms an initial project scope, budget and schedule. Furthermore, the main design principles are defined early in a design management process. Procurement management of design is essential for ensuring the effective and co-operative design process. Project manager seeks to utilize familiar designers that know the developers practices and standards.

In development and draft design phase the design manual and initial data is given to designers and the written design contract is signed. In the case company, the cost management is executed mainly with the help of comparative calculations and standardised designs and targets. If the design does not meet the spatial and design efficiency targets, the designs are revised as many times as it is necessary to meet the targets. Skilled project team can quickly see too expensive solutions and make cost effective corrections to the overall design. A project manager should also have skills in estimating the demand in the particular area. Estimating the demand correctly is essential for setting optimal apartment program and the quality level.

The design work is controlled and monitored throughout the design phase. Extra attention is given to the integration management of the design fields. There is an established process for ensuring that designs are integrated together. For instance, the architectural, structural, landscape, geological and building services solutions are reviewed together in specific meetings for ensuring that there are no conflicts.

In CRD, the role of design management is emphasized as customer segments are more complex and the planning phase influences greatly building design. Furthermore, the positive and negative effects of design solutions of a building design are amplified in large-scale projects, when similar solutions are used in multiple buildings.

3.2.3 PROJECT PROCUREMENT PROCESS

Currently YIT Construction Service Finland project procurement process has been divided into following subprocesses: procurement planning, call for tenders, handling of tenders negotiations and quality control.

The main knowledge area in project procurement process is obviously procurement management. In a small-scale infill development, the procurement process is not overwhelmingly complex. However, the comprehensive development projects require more planning as the larger scope and longer timeframe have to be taken into account.

3.2.4 CONSTRUCTION PROCESS

Currently YIT Construction Service Finland construction process has been divided into the following subprocesses: construction preparation during design phase, cost estimation, construction planning, construction commencement, construction management and reporting, subcontractor and supply management, handover and ending the site operations.

Peculiarity here is the subprocess of Subcontractor and supply management. As speculative residential developers do not usually have own construction workers, the subcontractor management process is under the Construction management and reporting process group. In Finnish subsidiaries of the case company, own trained and skilled construction workers have been seen as a strategic strength in the perspective of quality management and the company brand.

3.2.5 SALES & MARKETING PROCESS

Currently YIT Construction Service Finland sales & marketing process has been divided into the following subprocesses: market analysis, premarketing, marketing and sales and after sales.

The sales & marking process is active during the whole project life cycle, especially in comprehensive residential projects where marketing has a larger impact than in small–scale

projects. In the case company, sales and marketing processes are also grouped together even though sales and marketing are totally different processes executed by different people and with different skill set.

There is no externalized information on how marketing and sales personnel are involved in for instance project development phase. However, in interviews project development managers clarify that marketing and sales are involved by asking comments for project plans. On the other hand, marketing personnel imply that interaction during early stages of the project could be more systematic in order to achieve better product market fit.

3.3 MAIN STAGES OF A COMPREHENSIVE DEVELOPMENT

There are six main stages in the investment process of speculative residential development in the case company. Furthermore, there are 5 gates between the stages. The gates are decision (G1 and G3) or development control points (G2, G4, and G5). In stages 1 and 3 the project team aims to acquire approval for the financial commitment from the investment committee. If the project team's application content is acceptable and estimations meet the investment targets of a business division, the investment or commencement approval is granted. Stage 1 is critical from risk management point of view as the plot investment decision is made. Stage 3 is divided into multiple phases 3.1,3.2…3.n depending on how many phases are in the project. In the end of stage 3.1, the commencement of the first phase in the multi-phased development project is approved if the design profitability and business requirements are met. In the end of stages 3.2,3.3...3.n the commencements of subsequent phases are approved.

In the residential area development stages 2, 4 and 5 the investment committee monitors and controls execution of planning and construction in order to ensure that business targets are met and the risk exposure is tolerable. In the stage 2, the area and building design concept is refined, and its profitability is tested. After several phases have been completed the stage 4 is finished in Gate 4 execution review meeting, where project information is reviewed carefully. Finally, in the end of stage 5 the project is officially closed. The gate 5 final review meeting is organized for knowledge management purposes. The stage 6 continues until there are no

operations like home services deployment or guarantee maintenance activities by the case company in the area.

3.4 CASE EXAMPLES OF COMPREHENSIVE RESIDENTIAL DEVELOPMENT PROJECTS

During this research and development project, I have studied 34 YIT CRD projects. I excluded all projects that have less than three phases and have already been completed year or more ago. I asked division representatives to gather following information:

- General information: total area, building right, number of floors, parking solutions etc.
- Location information: map, services, infrastructure etc.
- Plan: master plan, phasing plan
- Project targets: number of apartments, business premises, spatial programme
- Visualization material
- Example building designs
- Customer segments
- Successes and failures so far
- Area marketing plan
- Innovations or new ideas
- Pro forma; financial analysis and
- Energy saving procedures

In order to make comparing area projects more effortless, I structured Microsoft PowerPoint and Excel templates where Project managers and analysts filled the related data. For this Master's thesis, I was not able to gather all necessary data for the comprehensive analysis of the impacts on costs, sales prices, pace of sales and development related to the location of the area. More about measuring best practices is in chapter 4.4 BENCHMARKING THE BEST PRACITCES.

As the goal of this study is to create framework for the further development of CRD process, I focused on good practises without in-depth analysis of the effectiveness of the particular practice. In other words, the goal of gathering these information packages from comprehensive development projects was to achieve understanding of the current state of the development processes and understand the scale and problem areas of the projects within the case company.

Country	City	Projects
Czech Republic	Prague	Hyacint
Estonia	Tallinn	Kalamaja
	Tallinn	Mäepealse
Finland	Espoo	Piispanpiha
	Espoo	Tillinmäki
	Helsinki	Ilmala
	Helsinki	Konepaja
	Helsinki	Merenkulkijanranta
	Helsinki	Vanhankaupunginkoski
	Hämeenlinna	Sairionranta
	Kirkkonummi	Ratavalli
	Nurmijärvi	Ratsutila
	Oulu	Etu-Löytty
	Oulu	Toppilan salmi
	Rovaniemi	Fenix
	Tampere	Niemenranta
	Turku	Konepaja
	Vantaa	Pakkala
	Vantaa	Vantaanlaakso
Latvia	Riga	Bikernieku
Lithuania	Kaunas	Lazdynu
	Kaunas	Silo namai
	Klaipeda	Jurininkai
	Vilnius	Vilspa
Russia	Kazan	Zvenigorod
	Moscow Oblast	5A
	Moscow Oblast	Potapovo-3A
	Moscow Oblast	MKP 10
	Rostov	Selmash
	St. Petersburg	Komendantski
	St. Petersburg	Novo Orlovsky
	Yekaterinburg	Rifei
	Zvenigorod	Sovremennik
Slovakia	Bratislava	Tarjanne

Table 3: Studied CRD projects

3.4.1 CASE EXAMPLE – KONEPAJA, HELSINKI

The Konepaja project is the most interesting case, which I have examined for the study. It is highly successful ongoing redevelopment project in Helsinki, the capital of Finland. Project managers have been required to work with diverse group of stakeholders. Media have been very interested in the development and marketing efforts have been exceptional in YIT perspective. Also, the process how the project came into being has offered many both good and bad practices.

Background

Largest comprehensive residential development project under construction in YIT is Konepaja –area in Helsinki. The Konepaja area is typical redevelopment project in extended central area in Helsinki just few kilometres form city centre with great services and transportation connections in the vicinity (figure 11). The area is large and used to be loosely utilized. However, as time has passed, it has been surrounded with tense urban structure. YIT is involved in three detailed planning zones in the Konepaja -area, and gross floor area of the YIT residential development is approximately 100 000 m2.

The Konepaja means machine shop in English. The Konepaja area consists still of charming old machine shops and other smaller brick buildings of the State Railways. The built history of the area begins from 1903, when State railways established first machine shop in the area. Gradually the State Railways expanded the maintenance and service facilities for over the area of 15 hectares.

Now the area is in the state of renewal. The industrial functions are replaced with residential and commercial buildings after the contaminations in the ground have been cleaned. The most valuable historical buildings in the middle of the area are machine shop buildings that have been made out of traditional red bricks. These old industrial buildings create a harmonious entity and give a strong identity for the area. One of the key targets of the redevelopment has been conservation of this historical setting that functions as a reminder of the era of industrialization in Finland.

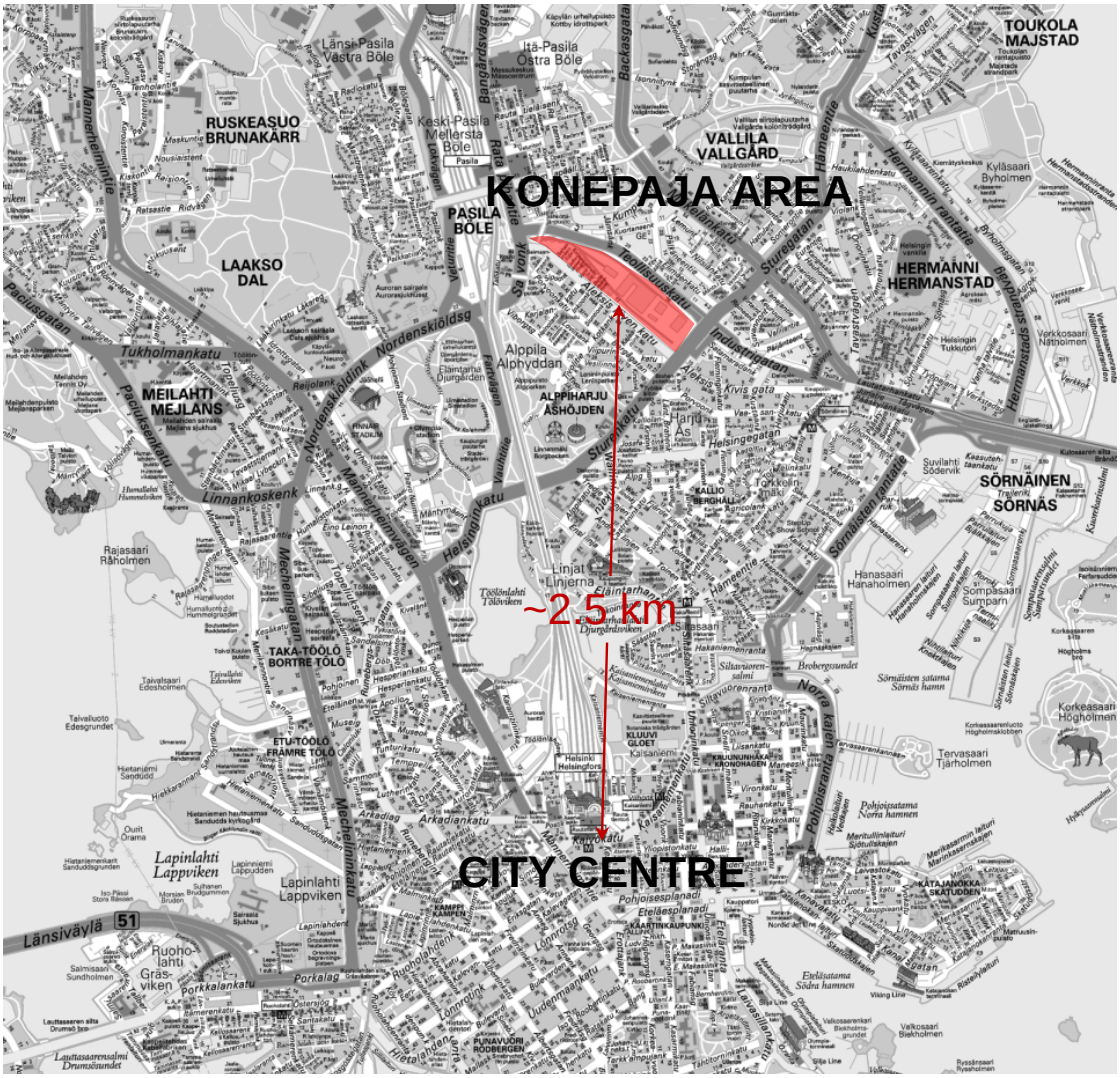

Figure 11: Location of the Konepaja area in relation to the city center

Design management

In the figure 12 can be seen that Rejuvenated Konepaja –area is divided into three zones or development stages. Each zone forms its own unique urban structure. North of the area Sahamäki blocks and natural stone retaining wall in the street of Konepajaraitti forms a

continuous facade towards the lower railway yard. New block structure extends the urban outline and scale of adjacent district. New half open blocks open towards the southwest and are connected to each other with a pedestrian walkway. The facade materials have been unified in the Konepaja –area, and red brickworks mostly dominate it as it emphasises the old industrial identity.

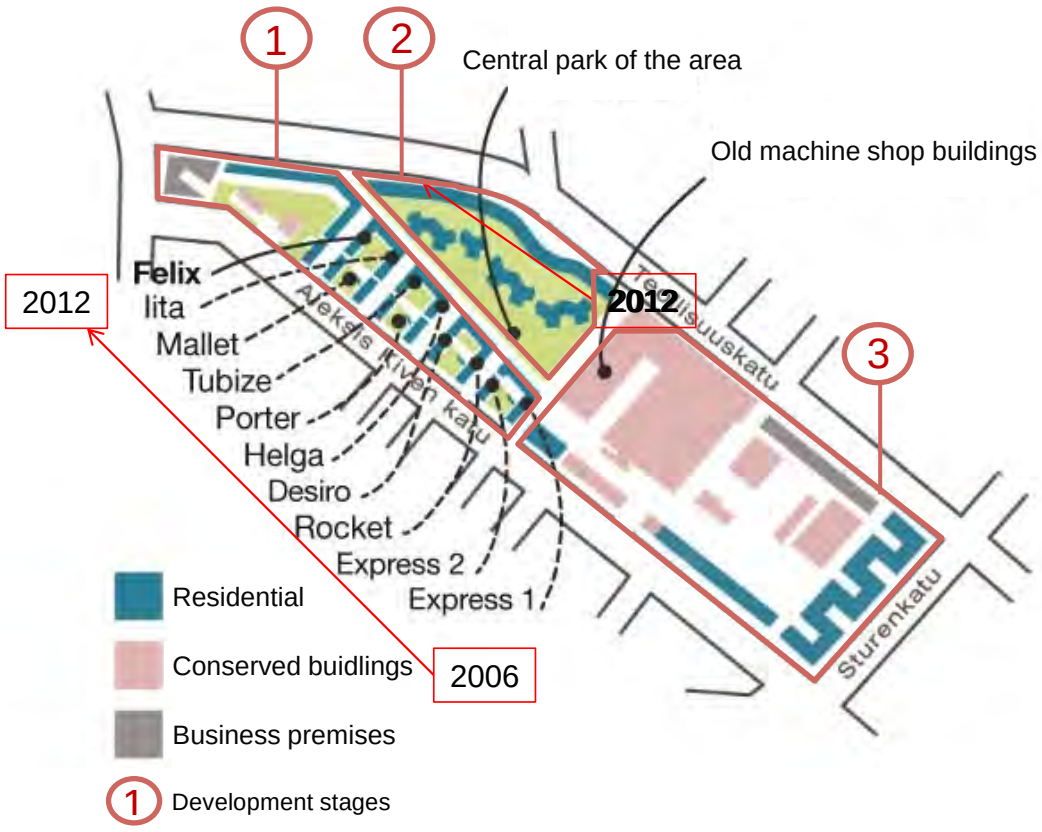

Figure 12: Overview of the Konepaja -area

Another side of the area long continuous building mass acts as a noise barrier and cuts noises from the heavy traffic in the street of Teollisuuskatu. In the middle of the area, there will be a relatively large and uniform park that will be surrounded by the new residential and the conserved machine shop building.

City of Helsinki typically dictates the urban design to a large extend and Konepaja was not exception. The official design guidelines document included detailed specifications of building and general urban design in the area. Typical example of design regulation was the maximum amount of balconies on top of each other, which was three in Konepaja –area. YIT sought to ensure that architectural quality level is in line with price level of the location. Currently the residential price level of unsold apartments in the area is 5973€/ m2 and the average apartment size of unsold apartments is 75.5 m2.

City of Helsinki has had the regulation for average apartment size of 75 m2 in multi-family buildings. However, in stage 1 the ruling for the average floor area was 65 m2, but on the rest of the area it is 75 m2. This has set some restriction to apartment programming in the area. For every 30 m2 apartment, there had to be one 120 m2 apartment. To put this in the context, the average apartment size in the nearby Vallila area is 43.5 m2 and 62.8 m2 in whole Helsinki (City of Helsinki statistics 2010). The political goal has been to increase amount of families in Helsinki area and mitigate the trend where families moved to suburban areas around the Helsinki.

Now, different problem has arisen from the changes in the urban demographics. The amount of single households and the average age when people have their children is constantly increasing in western societies (Gils & Kraaykamp. 2008). Therefore, the demand for a small apartment has increased. According to YIT, usually families with children are not willing to move to the inner city area as they do not benefit as much from a central location as active households without children do. Some indication of higher demand of smaller apartments can be seen from the average unit costs. The unit price of unsold apartments under 50 m2 (9 apartments) are 15% more expensive than apartments between over 50 m2 (72 apartments) even though there are many unsold 2-floor penthouses and other disproportionally expensive apartments in the sample.

The city of Helsinki has removed the rule of average apartment sizes at the end of 2012. In the place of it, there is a proportional rule. For instance, 50% of apartments can be small studio or one-bedroom apartment, and the rest of the apartments has to be just over 80 m2 and at least two bedrooms. The minimum apartment size is 20 m2. However, this new ruling do

not benefit apartment programming and building design in the area as the detailed plans have already been ratified.

YIT arranged invitational architecture competition in stage 1. It was won by NRT Arkkitehdit with a competition entry that combined red bricks with details of brightly coloured metal panelling (figure 13). All stakeholders, the land owner, city planners and YIT, were pleased in the results of the architectural competition. For the second stage, architect from Netherland was invited to create a master plan for the area. However, the co-operation with the architect and the developer did not function. According to YIT, the planner did not know Finnish building code, and he pursued to create landmark architecture compromising the affordability of housing in relation to solvency of most potential customer segment in the area. Furthermore, the building masses the Dutch architect designed was considered unsuitable for well-functioning and effective apartments. The master plan of the second stage was finished by Finnish architects.

Car parking regulations always have significant influence on project costs. As planners have no way to know the local demand of parking, the parking is not market-based and will most often penalise the carless inhabitants especially in inner city areas (Manville 2010). This is also the case in YIT Konepaja. For instance, there are still unsold parking places even though the project is finished over 3 years ago and price of parking units is significantly below the construction costs. In Konepaja area, the parking is organized in 1 or 2-level underground parking facilities under the apartment buildings. Parking regulation in Konepaja area is one place per 125 m2 of apartment floor area. That equals about 0.56 parking places per apartment.

Figure 13: Konepaja -area stage 1 architecture

Phasing

There are about 30 phases of residential development in the area (figure 14). The first phase was the development of the most valuable plot, which was closest to the city centre in the southeast corner of the area. The construction order of phases was planned so that development continued from South East to North West. In this way, the disturbances for the occupants are mitigated as completed urban environment is at one side, and the construction site is at another side. In 2012, YIT started constructing the other side of the area in order to diversify the residential product in the area. Now, phases are started about a month apart in both stages of the project every year. Timing of commencements has been market-based so far.

Figure 14: Illustration of the residential phases in Konepaja -area

Sales & Marketing

The marketing and the branding of Konepaja area originated from the historical setting and its central location; distinguishable machine shop identity and good services were largest selling points. Additionally, there were plans to coordinate numerous services inside the Konepaja – area by renting the premises in the conserved buildings to service providers. To promote these properties and to raise awareness, YIT marketing organized billboards in the vicinity of area (figure 15) and tram advertisements (figure 16). Other implemented marketing practices were public and collaborative events inside the area and public art competition, where contestants designed an artwork for the construction site hoarding in the South-West corner of the area.

Figure 15: Housing estate marketing with billboards (“When old and new meet”)

Figure 16: Housing estate marketing in trams ("In London it is Dockside. In Helsinki it is Konepaja", "Something unique in the inner city")

Successes and challenges

We asked business units to provide table of successes and challenges related to a comprehensive development projects. The following list of successes and challenges was provided related to Konepaja –area.

Successes:

- Plot acquisition: cooperation with land owner (State Railways **)**
- Payment terms: plot payment after the detailed plan is ratified and with payment schedule

- Phasing: The project has been divided into optimally sized phases which have ensured steady sales and production.
- Phasing: The area has been divided into planning stages which have ensured the better management of tied capital.
- Marketing: the marketing campaign that was in the beginning of the project was successful
- Human resources: the project team has been almost the same throughout the project.

Challenges

- Parking: expensive 2-level underground parking solution
- Planning: Too many large apartments, because of required large average apartment floor area
- Planning: cooperation with foreign architect was difficult

Project status

Now the last building of the first stage is in the design phase, first buildings of the second stage are under construction, and detailed plan of the third stage is recently approved. In the table 4, it can be seen that ten phases are completed, and four are under construction. Furthermore, it can be seen that average yearly apartment sales rate from 2006 to 2012 has been 72 apartments in a year. If there are no other commencements in the year 2013, the average rate of housing start-ups in the area is 76 apartments in a year.

Table 4: development status of Konepaja area

Phase	Housing company	Status	Number of unsold apartments (total number of apartments)	Date of commencement
1	Asunto Oy Helsingin Express 1	Completed	0 (49)	30.6.2006
2	Asunto Oy Helsingin Express 2	Completed	0 (44)	2.11.2006
3	Asunto Oy Helsingin Rocket	Completed	0 (54)	11.5.2007
4	Asunto Oy Helsingin Desiro	Completed	0 (46)	15.10.2007
5	Asunto Oy Helsingin Porter	Completed	0 (43)	1.5.2009
6	Asunto Oy Helsingin Helga	Completed	0 (53)	9.11.2009
7	Asunto Oy Helsingin Tubize	Completed	0 (41)	24.5.2010
8	Asunto Oy Helsingin Mallet	Completed	0 (49)	17.3.2011
9	Asunto Oy Helsingin Iita	Completed	4 (55)	16.9.2011
10	Asunto Oy Helsingin Wilhelm	Completed	2 (28)	21.11.2011
11	Asunto Oy Helsingin Felix	Construction	12 (47)	27.3.2012
12	Asunto Oy Helsingin Hjalmar	Construction	16 (29)	20.4.2012
13	Asunto Oy Helsingin Rafael	Construction	13 (23)	1.2.2013
14	Asunto Oy Helsingin Bliksti	Construction	41 (53)	1.3.2013

The recent financial crisis has influenced the rate of housing start-ups in the area. The average duration between phases has been less than six months, but when the recession hit the market in 2008 the time between phases 4 and 5 extended to 18 months. Economic cycles are one reason that makes predicting rate of production and sales difficult in large-scale projects. However, turnover time of a large-scale project might be longer than the boom and bust cycle. Therefore, the average estimation of overall price inflation in the area might be relatively high.

3.5 CURRENT CHALLENGES IN COMPREHENSIVE RESIDENTIAL DEVELOPMENT

From the researched development projects and interviews I could identify certain problem areas in comprehensive development process of the case company. Often the legal and political regulation and other threats in business environment, such as environmental, social,

and technological changes were seen as challenges in residential development business. For the researched projects, workshop and interviews helped us to identify certain challenges in a comprehensive development process within the case company. For instance societal benefits of obligation related to accessibility and energy conservation are understood, but measures are too excessive and incoherent. Many are frustrated that developer's expertise from day-to-day transactions, on what customers want and need are neglected with ever increasing regulations.

The case company had a strategy that they will develop only residential buildings that are 15% more energy efficient than the regulations demanded. The energy forerunner strategy in energy efficiency ended when the new energy conversation regulations leveled the difference between YIT and the competition. The case company was hoping that customers would value the reduced energy expenses and benefits for the environment. However, the apartment sales showed that customers undervalued the energy efficiency improvements in relation to increased costs. Another way to put it is that customers invested the extra sum in increased floor area or a better location rather than in better insulation and heat recovery systems. This example illustrates the conflict between developer's short-term perspective; what customer wants, and public authority's long-term perspective; what should customer want.

Often the largest competitor for the speculative residential builder is the secondary market. One hypothesis is that as the regulations increase, the more costly it is to develop new housing. Furthermore, the apartments, which are without regulatory quality improvements in the secondary market, are more attractive to potential customers. This might reduce the feasibility of the residential development and thus reduce the overall housing supply and, therefore, increase prices in the long run. As the price level in the secondary market is higher, because of higher demand, the overall price level has increased after the regulations have been introduced, and people have to make compromises on the living quality and use more time commuting.

Preceding complexities related to the housing market might be the reason why developers consider the regulations as a threat. If the home buyers do not value the quality improvements

that regulators demand, the developers consider the design limitations as a development tax. It is a political question if public authorities should regulate less and let the housing markets take some of the responsibility for the social and environmental sustainability. In the end, the regulations are central in a complex system of urban development, and the regulatory effects to the housing market should be understood better.

However, the best actions to mitigate these changes in the business environment are to increase adaptability in the development processes. In other words, every competitor basically has the same changes in the business environment and the only logical way to gain competitive advantage is to increase adaptability.

Following challenges in CRD business were identified in interviews and workshops:

- There will be more regulations on accessibility
- Internal logistics of the area and its connections to city transportation network
- Car parking; oversized parking spaces with low utilization degree is significant liability
- Scheduling problems caused by delayed detailed planning
- Infrastructure is too slowly attained; area is not developable
- Area is too large for development; Duration of the project is too long
- Amount of tied-up capital is increased too much and, therefore, profitability is reduced
- Too large portion of plot payments is made in the early phases of the project
- Product is too expensive in relation to the local market
- Economic cycles diminish profitability of residential area, and often there are no possibilities of developing more versatile products (social housing/ rental)
- Large projects attract large resistance

3.6 KEY DIFFERENCES IN COMPREHENSIVE RESIDENTIAL AREA AND SMALL-SCALE INFILL DEVELOPMENT PROCESSES

In the Case Company, there are no significant documented differences between the processes in comprehensive residential area development and small-scale residential development processes. Same tools and project management practices are mainly used in both processes. Small-scale housing development is relatively systemized, and in complex comprehensive development practices are difficult to standardize.

Based on expert interviews and workshops the general understanding is that CRD has larger extend of refinement than small-scale infill development. The figure 17 illustrates the ideal case of housing development, where CRD incorporates more risks, services, knowledge, capital, fixed costs and capital than small-scale speculative development projects and other housing development models. However, as the degree of refinement and risks increase, the profitability of the project should also increase in order to achieve long-term sustainable business development.

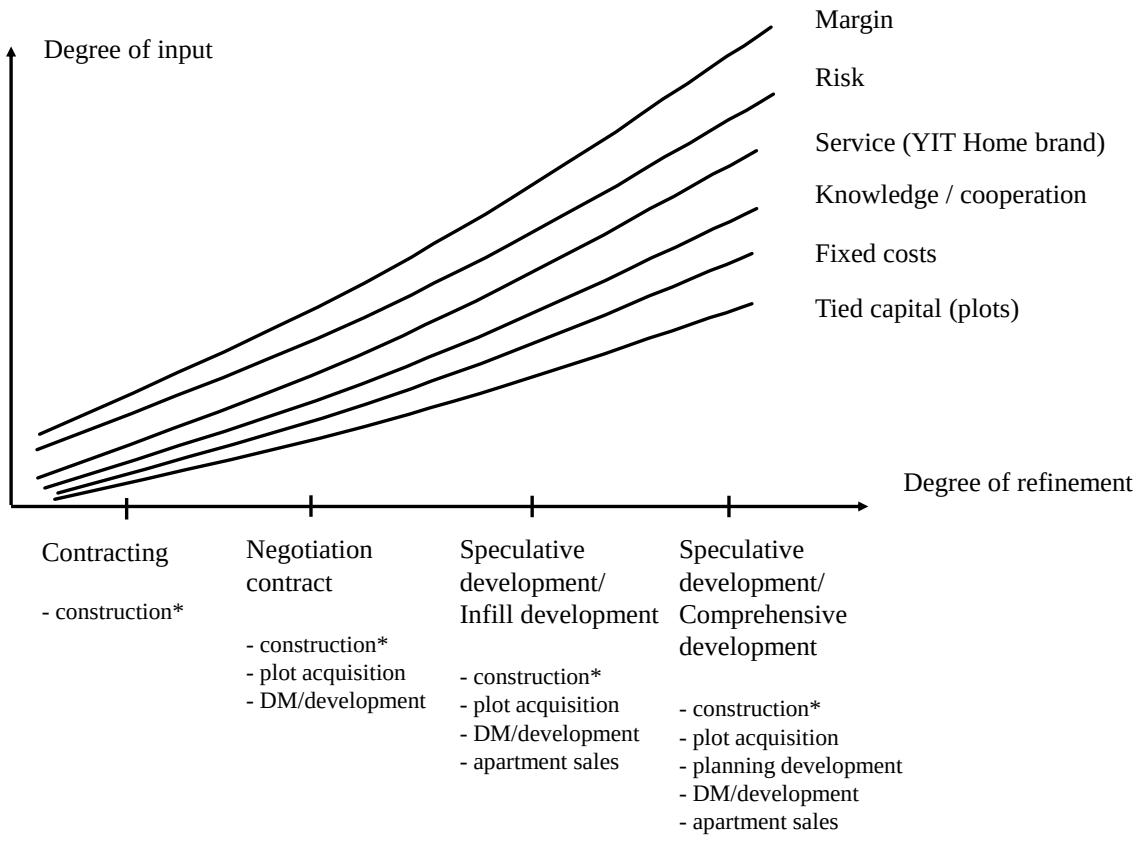

Figure 17 : Key differences between building construction business models in YIT (Modified from: Jouko Kemppinen)

It has been identified that practices that reduce risks, fixed costs and tied capital have to be developed consistently. Moreover, the knowledge and stakeholder management practices have to be integrated to exciting processes. Furthermore, in order to achieve full business potential in CRD, a wider range of services should be offered to customers. In the large-scale residential development projects, larger number of customers creates feasible service business environment for partners and occasionally for the developer. Additionally, when developing large-scale projects urban planning management is one of the core competences that speculative developer should have in plot acquisition, design management, procurement/construction, marketing and sales.

The project sizes in both brownfield and greenfield development projects have effects on every knowledge area of speculative housing development. In table 5, the theoretical effects

of project size can be seen as a plus and minus signs. The strength of the positive or negative effect can be seen as a higher number of corresponding signs. In the table positive and negative effects are structured around the four core processes: plot management, design management, construction/procurement management and sales and price management.

The overall plot price is naturally higher in larger projects, but the price in relation to the amount of purchased building right reduces as the plot size increases. The relative plot price reduces, because of the reduced demand in consequence of higher risks and increased need for invested capital and knowledge. However, as the plot size increases, the system becomes more complex; there are more stakeholders involved, more complicated planning and endorsement procedures and more problematic infrastructure arrangements. This complexity increases the relative prices of infrastructure and the overall development time.

In design management more profitable designs can be achieved as the amount of building right and the number of buildings increases. In other words, many resource efficient building design solutions can be replicated. Therefore, it is feasible to use resources extensively in the design of the first building in the area. Furthermore, the designs can be improved as the project advances with efficient knowledge management. The building design solutions can be, therefore, refined, and the most of the design faults can be removed. However, in practice there is a delay before designs can be improved. In other words, recognized design faults and improvements cannot be implemented to the design of the next building, but one after that or later.

The schedule management of the project is more difficult as the scale of the project increases. The difficulties are originated from the increase of general complexity of the project. There are more stakeholders and more political interests as the impact of the project increases. The increased impact to the cityscape decreases the predictability of the planning process, hence making the time management increasingly difficult. The unpredictable development time increases the risk related to the development project.

In addition to increased planning time in large-scale projects, the designs of the first building are developed carefully with authorities as it determines the overall level of aesthetics and

functionality in the area. However, the commencements of following buildings can be scheduled accurately as overall scheme of the area is agreed with the planning authorities.

	Small area	Normal area	Large area
Plot management			
- Plot price	+	++	++++
- Junctions + infra	-	--	----
- Realisation time	-	--	----
Design management			
- Design profitability	+	++	+++
- Schedule mgmt (constr. permit)			
- 1st phase	-	--	----
- Next phases	++	++++	++++
Procurem./constr. mgmt			
- Costs	+	++	++
- Quality/schedule mgmt	+	++	++
Sales and price mgmt			
- Sales by pricing			
- Volume sales (production based start-ups)	-	--	---
- Profitability sales (market based start-ups)	+	++	++

Table 5: How project types effect project economy (Modified from: Jouko Kemppinen)

3.7 KEY DIFFERENCES IN COMPREHENSIVE RESIDENTIAL DEVELOPMENT BUSINESS ENVIRONMENTS IN FINLAND, CENTRAL AND EASTERN EUROPE AND RUSSIA

The complete study of differences in the business environments of CRD is beyond the scope of this study. However, the goal of this study is a creation of best practices framework for the residential area development and the prerequisite for it is to understand the key differences in these three business environments. In this chapter, I describe the key differences that were brought up in interviews and workshops. In depth analysis of these key differences will be also the subject of further studies.

Market liberalization has occurred in Finland much earlier than the collapse of Soviet Union. Estonia, Latvia, Lithuania and Czechoslovakia (Now two separate countries Slovakia and Chezh Republic) were all part of Soviet Union. Now, they are considered as emerging markets, as well as Russia, but their governments and markets are leaning to the west (BBVA Research 2012). This is the reason, why many in the case company consider the markets and legislature in Central and Eastern Europe, CEE, as being in the intersection of Finland and Russia.

The case company separates housing product and service development into two departments: Russia and the rest. This indicates that not only city planning and legislation are different in Russia, but the customer preferences are also dissimilar. For example, the most popular kitchen type in Finland has been an open kitchen since the perfection of extractor hood. Also, In the Central and Eastern Europe the open kitchen is the most popular kitchen type. Conversely, in Russia the "closed" kitchen is most popular kitchen type. However, the kitchen example is not perfect because the assumption about the preference is not comprehensively verified. Besides, there have been indications that this preference might be changing among Russian customers.

Another key difference in the business environment in relation to apartments is Russian customers' preference to "Shell and Core" finishing level, which means that apartments finishing is conducted by the customer. The developer builds only structures and some of the apartment HVAC systems. The customer can have an apartment fully finished with ordering additional work from a developer, but this option is rarely used.

Key customer preference differences in a residential area design are customers' willingness to sharing economy in Finland and Central and Eastern Europe. Whereas in Finland customers might value sauna, gym or even grill on the yard that is owned by the housing company, the Russian customers value more the individual ownership. Again, above assumption is based mainly on intuition of Russian project managers and can be questioned. Intuition based on professional experience can often be correct in estimating preferences of potential customers. However, customer preferences are constantly changing, and intuition might be slow

following the market trends. Therefore, business assumption should always be questioned and tested when possible.

Customer preferences have great differences in the case company's business environments. However, Russia cannot be assumed to be one harmonious business environment as the cities in Russia have great differences in customer preferences and legislation. For example, planning authorities in St. Petersburg are much more open to western influence on architecture and urban design than other major cities in Russia. Moreover, the building regulations differ in Russian cities significantly. Even in Finland there are significant differences in urban planning between Helsinki and other Finnish cities. In Helsinki, the cityscape is most regulated and greatly limits the degrees of freedoms in design management of apartment blocks and urban areas.

The variances in city planning and legislation are causing the greatest differences in the case company's business environments. In Russia, for example, the insolation regulations determine the minimum amount of direct sunlight that every apartment has to get. This significantly limits possibilities in an apartment block design. In Finland legislation and city planning authorities are relying more on market mechanisms for ensuring that developers optimize the daylight in every apartment. However, in Russia if developers follow insolation, green area and other regulations there are more degrees of freedoms to do apartment block and residential area design than in Finland, which enables development of residential areas with good product-market fit.

During interviews and workshops I tried to form unified understanding on how the planning status on the plot effects project risks in operating countries. Finland, Russia and CEE countries all have similar hierarchical city planning system. I mapped the planning stages (table 6) and what certainties are in every stage in order to understand how risky the plot acquisition is. Risks related to planning status include risk of reduced building right, increased development costs and commencement delays. The Building right risk influences significantly the projected revenue, and if a business unit has not been able to tie the plot price to the building right, the result can be disastrous to project economy. Development cost risks are mainly related to the quality improvements by the planning authorities. Parking

requirements have a significant impact to project finances especially if a developer has been preparing to the development of overground parking, but new requirements demand underground parking solution. Schedule risk is significant when the developed plot is on Greenfield or undeveloped land without detailed city plan. The duration from plot purchase to commencement might take many years and decreases project profitability significantly if not taken into account in plot negotiations.

	Stage of city planning	**Description**
Finland	Regional plan	The regional plan is a set of structural guidelines that are legally binding
	City master plan (layout)	City scale plan for Land use and infrastructure
	City Local plan (layout)	Local plan outlines a development area's land uses and overall character
	City detailed plan (text and layout)	The basic design layout and building outlines, planning conditions, together with written statement outlining the development
	Stage of city planning	**Description**
Russia	City master plan (layout)	City scale plan for Land use and infrastructure
	Regional land use norms (text)	Written statement of regional norms for land use (calculation rules)
	Local Plan or Urban Land Use Plan (PPT) (layout)	The basic planning conditions
	Land split plan (layout)	
	Detailed plan or Town Plan of Land Plot (GPZU)	Based on this document, the building design is done and drawing goes to expertize, after expertize the construction permit is acquired

	Stage of city planning	Description
Slovakia	National plan	Concept of territorial development of Slovakia
	Regional plan	Regional urban planning / "VUC" – Higher territorial units/regions of Slovak republic**.** It involves mainly functional arrangement of residential areas
	City Urban plan (layout)	Municipality urban planning (UPN – O plan) - spatial arrangement and functional use of area and landscape formation
	Urban study of zone/area (detailed layout) - City local plan/masterplan	Municipality zone planning (UPN – Z plan) - contains regulation elements determining functional use intensity of land use
	Planning permit proceedings	Planning permit and approved planning permit project documentation - main objective is to uphold the principle of the City Urban plan or detailed Urban study of zone.
	Building permit proceedings	Building permit and approved building permit project documentation based on Planning permit.

Table 6: stages of city planning

Another important factor that has to be taken into account in Russia is infrastructure costs. In Finland municipalities are obliged to build the required infrastructure for the developed area. The municipalities collect land-use fees form the developers to finance the infrastructure. Conversely, In Russia a developer is to build or finance the infrastructure for the plot. Especially social infrastructure, such as nurseries and schools, has to be taken carefully into account when committing to the plot, because they have very negative impact to the cash flow. The calculation rules of how much social infrastructure has to be developed vary between cities. According to local project manager, there is often a risk that it has to be more social infrastructure than was intended in plot acquisition stage.

Transportation, energy and other “hard” infrastructure have to be naturally constructed in the plot by the developer. The developer might have to “bring in” the connections to the plot from long distances. The junctions outside the plot increase the financial risks significantly because it is challenging to ascertain that connection is ready in a set date. Furthermore, if developer starts building housing blocks before junctions are ready, there is a risk that junction costs increase, because of increased negation leverage of the network “monopolies”.

In the workshops there have been discussions about the differences in the legal framework especially considering agreements with land-owners and area marketing. These legal issues are currently more careful, and issues presented in the workshops might not represent current understanding of the state of affairs. For instance, according to workshops, agreements with land-owner that are more advantageous for the project cash flow are difficult to form. Usually land-owner wants to cash in the plot immediately, or developer cannot guarantee that the plot owner does not sell the plot to third parties after the first instalments.

Another good example of how legislation can impact to the business environment of the residential area development is marketing regulations of properties. The case company’s strategy is to develop residential areas that differentiate from competitors’. In order to achieve full benefits from differentiation, marketing effort should ensure adequate awareness among target customers. This is especially important before construction so that the project achieves “good sales momentum”. However property marketing regulations prohibit showing any illustration from the project, before construction. If a developer is unable to show any visualizations related to the project, which is in the planning stage, it is very difficult to raise awareness and get potential customers interested.

In conclusion, there are significant differences in business environments, but there are also enough similarities to form unified process model for CRD. The process model has to be flexible enough to adapt differences in legislature, urban planning procedures and customer preferences. In next chapter, I introduce the knowledge framework, which creates a foundation for knowledge management in the case company. The framework does not address issues related to the differences in business environments but is a general model for all business environments. For instance, the infrastructure management is a key knowledge area

in Russia and should be added to localized knowledge management framework.

4 SUGGESTION FOR COMPREHENSIVE RESIDENTIAL DEVELOPMENT KNOWLEDGE MANAGMENT

4.1 PLANNING OF THE SUGGESTIONS AND THEIR INCORPORATION

In this chapter we'll examine some of the identified best practices and answer the first research question:

1. What are the case organization's unified best practices in Comprehensive Residential Development that can be applied in every business environment?

Secondly, the best practices related to responsibility areas and identified during workshops and interviews are categorized into key knowledge areas. This will create a hypothesis for the second research question:

2. What are the key knowledge areas in Comprehensive Residential Development process?

Finally, based on theory and organizational research I will describe the knowledge framework of CRD project management. The framework will improve organization ability to identify, collect, categorize and distribute best practices, which will, in turn, improve quality and reduce costs and risks. In order to make implementation of best practices more efficient and ensure long-term development of processes, we created a prototypical tool for knowledge, process and project management to be developed in the future. We call it Development Operating System or DOS. It can be used for a passive process and knowledge management tool or an active training and project management tool. These suggestions will create a hypothesis for the third research question:

3. How to continuously implement best practices to unified comprehensive residential development process?

4.2 SUGGESTION FOR THE KNOWLEDGE FRAMEWORK OF COMPREHENSIVE RESIDENTIAL DEVELOPMENT

We created the knowledge framework for supporting knowledge externalization, combination and internalization. The framework divides the CRD process information into manageable quantities.

The knowledge framework has three dimensions: human, time and target. The human dimension is related to responsibility areas and answers the question who. The time dimension is related to project stages (see chapter 3.3) and answer the question when. It particularly answers the question what is the relation to the other tasks. Finally, the target dimension is related to knowledge areas and answers the questions why, how and what. In practice, the information in target dimension can be understood as a set of tasks that help achieve the target. The tasks divide and sequence the whole work flow into intuitive and manageable quantities. The framework could have also a dimension for project types e.g. infill development, co-operative development and mixed-use development, but in this study I focused only on large-scale residential area projects.

Every collected best practice is transformed into concrete tasks and placed into knowledge management framework. For instance, the practice, *when determining design targets, a brainstorming session should be organized with marketing and sales team,* can be categorized with using the three dimensions. Above best practice belongs to design and integration responsibility area, the practice is conducted in stage 2 before describing design targets, and it is in project research & development knowledge area. In the figure 17, the dimensions of the framework are illustrated. The blue colour represents dimensions and the orange colour represent the coordinates of the above brainstorming related best practice.

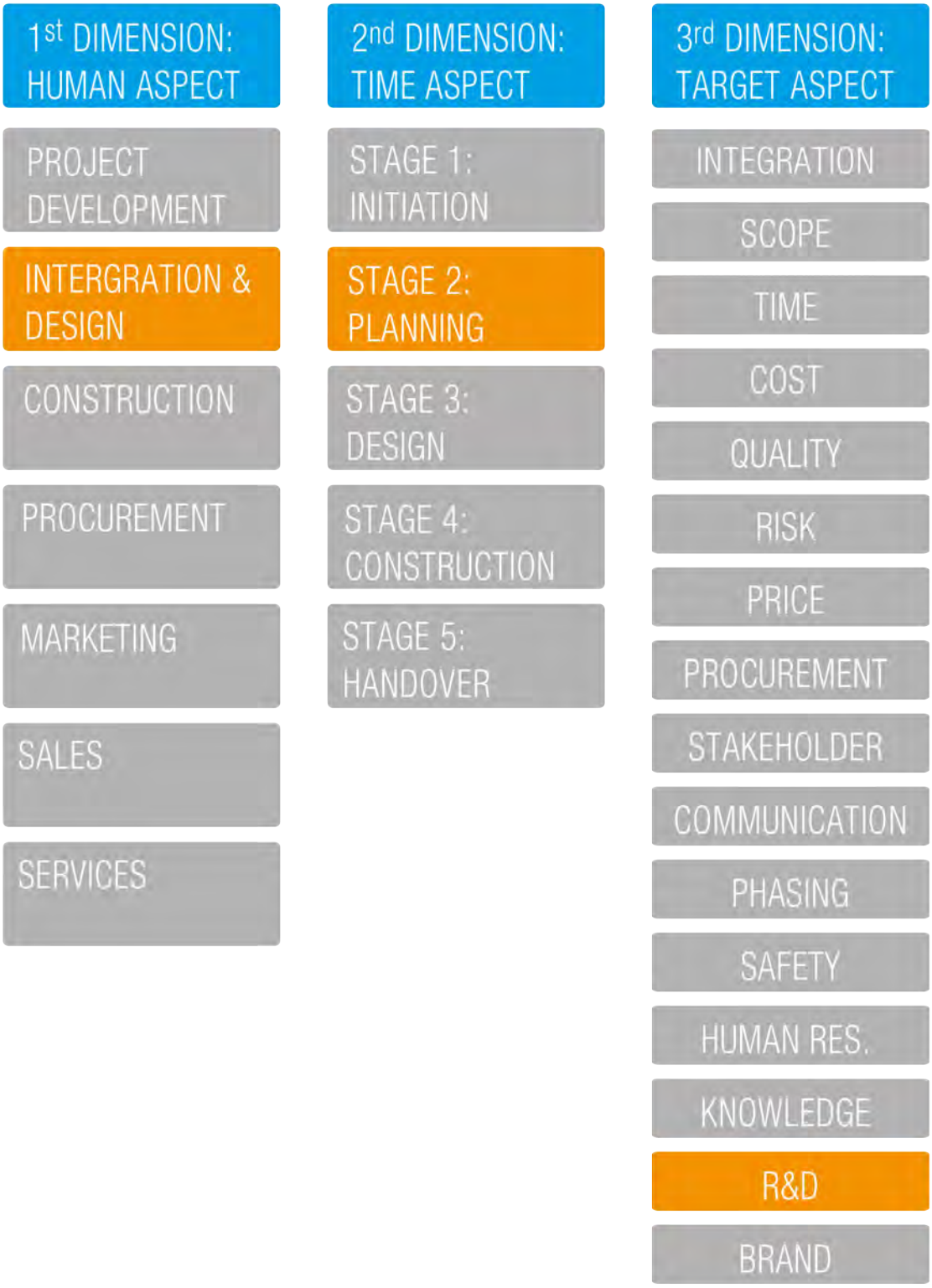

Figure 18: The dimensions of CRD knowledge management framework

In other words, the best practices in CRD should be transformed to concrete tasks. It has to be determined who is responsible for it, when it is done and what the purpose of the task is. Every task could include also metadata about task interdependencies, how and when it is done and who has created it.

Responsibility areas, project stages and knowledge areas are purposefully shaped to resemble buttons of the web interface in the Figure 17. The buttons represent the interface in the cloud storage based approach to the implementation of best practices. The ideal architecture of cloud based corporate development operating system or DOS will be based on the comprehensive residential development knowledge management framework. In theory, it will enable long-term extensive comprehensive collection, implementation and development of corporate knowledge, which will in turn improve overall project performance in all subsidiaries.

4.2.1 IDENTIFIED BEST PRACICES AND CORE RESPONSIBILITY AREAS

We collected a wide variety of practices that business units have identified as a local best practice in CRD. Soon, I started to identify some practices that many business units have brought up. Many practices were applicable also in small-scale infill development projects, but most of the methods were specifically implemented in a residential area development projects.

In this study report, I do not examine all the case company’s best practices. I describe some of the best practices in order to ensure a reader understands the selection of the key knowledge areas of the knowledge framework. I will explain some of the most common best practices that many business units have identified. I will show some of the reasoning, why I selected these business units’ best practices to be applied as YIT's best practice. In the next chapter the identified, universally applicable, best practices are defined in the context of related knowledge area.

Analysing and identifying concern level best practices have been challenging because of the differences in business environments as described in chapter 3.6. In addition to differences in

business environments, there are significant differences in business units' processes and process externalization and standardization as defined in chapter 3.2. To illustrate this, some of the most critical best practices identified in one of the Russian business unit have been already identified, externalized and implemented in every Finnish business unit.

However, already in this first cycle of best practices collection and identification we're able to discover several best practices that could be included to companywide unified CRD process.

From the interviews and workshops I collected 319 practises that have been identified as best practices in business units (See table 7). Most of the practices were related to design & project management responsibility area. Many shared best practices were also in the marketing responsibility area, where many practices were focused on answering the question: what. On the other hand, practices in other process groups mainly focused on answering the question: how. This indicates that marketing is least developed and systemized process area in CRD. I did not directly ask practices in cross-project knowledge management and services, but few practices were obtained indirectly during the workshops.

Sales are the simplest process in the CRD from the process thinking point of view. There are not so many differences as the sales effort is focusing on the phase that is on sales stage. Consequently, there were only 9 best practices concerning the area sales process. The reason can be that we had grouped marketing and sales together to form one process group as it is common in the case company.

Services process was not examined directly during the interviews and workshop. Nevertheless, during the workshops it was mentioned that systemized process for managing the services in the area should be developed. Also, the development of the online services for the whole area was considered important. Now, YIT only offers the home customization services and housing company internet services in Finland. In Russia, there are also some maintenance services. Currently, In Finland there is no one responsible for coordinating services in the area. In the project team, there are only one or two members who are responsible for home customization services. In many business units, there are also calculation and administration responsibility areas, but these were beyond the scope of this

study. All collected local best practices were not relevant and there are many similar practices.

COLLECTED BEST PRACTIVES		
PROJECT DEVELOPMENT		32
DESGIN & PROJECT MANAGEMENT		119
PROCUREMENT		17
CONSTRUCTION		41
MARKETING		97
SALES		9
SERVICES		2
KNOWLEDGE MANAGEMENT		2
	TOTAL	**319**

Table 7: Collected best practices

EXAMPLES OF IDENTIFIED BEST PRACICES

In this chapter, I describe the samples of identified best practices categorized into responsibility areas. These best practices are reduced into one sentence in order to make these easier to remember and later make the implementation more convenient.

Project development

Clear comprehensive stakeholder communication plan have to be formed early in the project

Stakeholder communication has been identified in many business units as a problem area in CRD. Especially if the developed area is large, there are many stakeholders that are required to communicate efficiently in order to reduce project risks. To address this problem, the project development team has to create stakeholder communication plan which includes a list of identified stakeholders and required communication procedures. It is important to identify all the needs and expectations of individuals and organizations impacted by the project, and develop appropriate management strategies to engage stakeholders throughout the project life cycle.

Design & Project management

When producing spatial plans of separate building in the area, the scale of the whole development and the type of housing (rental/ownership) should be taken into account.

Understanding of the development project holistically has been identified as a key success factor in a residential area development. In other words, during the planning stage the functionality of the area, apartment design, project phasing, constructability, marketability, saleability and services have to be optimized simultaneously. For instance, taking into account the apartment design guidelines during master planning will make the apartment sales easier later in the project life cycle. In a large residential area, there is a possibility to market apartments to many customer segments. If the apartment offering is too narrow, sales will decrease after the needs of specific customer segment are met. Therefore, there should be apartments with varying quality levels and room programs in different stages of project life-cycle.

Procurement

The price level in an area development project should be fixed as low as possible in the tendering procedure by utilizing the economics of scale.

The above best practice is also quite obvious. However, there might be a risk that business unit's processes might be focused on the small-scale infill development and the full potential of economies of scale is not utilized in the CRD. Sometimes, it might be easier to tender one phase at the time without including the contract possibility for the whole area in the initial tendering packages and negotiations. It might reduce the project profitability considerably as suppliers or contractors business risks are not decreased.

Construction

Core of the site management team should be the same for the whole area project in order to maximize cross phase learning.

The professionalism and competencies of site management team were considered as important success factors in workshops and interviews. The project management teams cross phase learning is a great possibility in a residential area project, where design and construction solutions are similar, and sub-contractors are the same in many phases. This is an example of knowledge management through human resource management.

Marketing

Separate, adequate and comprehensive marketing campaign should be planned in order to develop area brand and support sales.

Most of the best practices in the residential area marketing were related to various marketing measures. There were not so much process thinking involved in answering questions about who, and how the marketing should be executed. The main targets of project related residential area marketing are to raise awareness and emphasize or reestablish the identity of the area. Identity of the area has been also termed as area brand during the workshops and interviews. Measures of raising awareness are relying on the area brand, which is built on natural, historical and social setting and supported by distinguishable landscape and building design.

Based on the workshops, following adjectives universally encapsulate the good area brand: renowned, safe, functional, healthy, attractive and distinguishable. Furthermore, when developing the area and establishing the area brand, the most potential customer segment has to be considered carefully. For example, I identified three customer segment variables to consider when determining the design scope of a residential area: communal – private, depot – identity and nature –services. The communal – private variable indicates the proportion of costs allocated to common areas and facilities. The depot – identity range takes into account how large proportion of costs should be allocated in creating a positive image e.g. facade architecture and landmarks. Finally, the nature – services variable is the most difficult to take into account when crafting the master plan. However, some cost allocation tactics can be utilized for this customer segment variable. For example, development of ground-floor retail properties meets the needs of services-oriented customers.

Sales

Scale models in a sales office can help customers to understand the future outlook of the area, which will ease the purchase decision.

One way to highlight the positive aspects of the area is to procure a scale model. It has been perceived that especially elderly person comprehend the area design better from a scale model than from digital visualizations or 3D –views. A scale model also makes the project more tangible for every customer who is planning to purchase an apartment.

Service management

Utilization of online services should be taken into consideration early in the development process.

Services that make day-to-day life more effortless are becoming constantly more important for customers. Homeowners demand for residential online services have been increasing. To meet this need, the case company has identified possibilities to offer online services in residential areas. For instance, common facilities and car parking can be more easily managed with common online reservation service in the area.

Corporate knowledge management

Regular meetings of own sales and marketing teams

During the workshops and interviews the need for systemized knowledge sharing between project teams and business units were mentioned often. Sometimes, broad best practice collection and processes unification such as this research and development project should be conducted. However, less formal and regular knowledge sharing meetings should also be organized systemically. As services management, the knowledge management is not a full responsibility area in YIT, but as I'm writing this, YIT is establishing a group whose responsibility is concern level residential area knowledge management. Currently, in many

business divisions in the case company there are safety and quality knowledge managers and in business units there are development engineers whose main focus is cross project knowledge management and improvement of information tools used in the development process.

4.2.2 KNOWLEDGE AREAS OF COMPREHENSIVE RESIDENTIAL DEVELOPMENT

We used the Project Management Body of Knowledge framework described in the chapter 2.3.3 as a foundation for the comprehensive residential development knowledge framework. However, I combined the PMBOK framework with business process management (see chapter 2.3.2) framework to create a management model that fits to the case company's operating model of speculative development. The collected best practices were categorized to the following 16 knowledge areas.

The comprehensive residential development knowledge framework includes following key knowledge areas:

1. Integration management – Target is to exceed stakeholder expectations
2. Scope management – Target is that necessary and only necessary work is done
3. Time management – Target is that we always know when a work is done
4. Cost management – Target is that costs are known and under control
5. Quality management – Target is that the quality level is as determined
6. Risk management –Target is that project risks are always under control
7. Price management – Target is optimal pricing of products and services
8. Procurement management – Target is optimal acquisition of resources
9. Stakeholder management – Target is that stakeholder needs are understood and then implemented and communicated back efficiently

10. Communication Management – Target is that the project team's information flow is adequate

11. Phasing management – Target is that the scope of the phase and commencement order and timing is optimal

12. Human resources management – Target is to maximize motivation and competence of the project team

13. Safety management – Target is that there are no events that can harm health.

14. Knowledge management – target is that progression of cross project performance is maximized through learning

15. Research and development management – Target is that the product, services and processes are improving constantly through new ideas

16. Corporate Brand management – Target is that organizations brand value is increased during the project

These 16 knowledge areas are created for enhancing the understanding and development of the complex system of comprehensive residential development. For instance, I could focus only on comprehensive residential development brand management and ask ourselves the question how we ensure that the YIT's brand value is increased during the development. Certainly, it is not necessary to have brand-related knowledge area, but it will help project personnel to understand also how long-term project value is created.

There could be many other knowledge areas that could be integrated to the knowledge framework, such as infrastructure management and BIM management. However, according to interviews framework of 16 knowledge areas are already too complex for many to understand. Therefore, I limited knowledge areas to 16 in this study. Moreover, the actual number of implemented areas, at least in first stages of implementation, will be even less as project personnel have limited resources for comprehending new knowledge. However, the framework should be adaptable so that knowledge areas can be added and removed.

Each of the above knowledge areas is derived from cost and price management. However, I need wider scope of knowledge areas to meet the interconnected targets of the projects. There can and there should be as many key performance indicators as key knowledge areas. In other words, for maximizing the shareholder value, project teams should be incentivised to achieve best possible performance in each knowledge area.

PROJECT MANAGMENT KNOWLEDGE AREAS OF COMPREHENSIVE RESIDENTIAL DEVELOPMENT

Every knowledge area is critical for the long-term success of the case company. In this chapter, I examine the key aspect of every comprehensive residential development knowledge areas. The target in this chapter is to help a reader to understand every knowledge area in the context of a residential area development. Furthermore, the aim of this chapter is to describe the most of the identified companywide best practices. The common best practices are defined in the context of related knowledge area. There are many best practices that are not applicable in every business environment, and those are implemented separately in the business units.

It might be difficult to understand the difference between responsibility areas and knowledge areas. For instance, procurement is both a responsibility area and a knowledge area. However, functional department of procurement in the case company is responsible only for procurement of construction work and materials. Conversely, a project development manager is responsible for procuring plots. Furthermore, a design manager procures drawings, marketing manager procures visualizations and other marketing material. Another way to see the system is to consider responsibility area as a subproject. For example, marketing manager’s project is to market the developed plot so that awareness and positive image targets are met. However, the marketing manager, for instance, does not need to know detailed tasks of safety management, but many other knowledge areas have to be understood to success in project fulfillment.

Project integration management

Purpose of integration management knowledge area is to systemize the best practices in coordinating all project work. Integration management includes all the activities needed to

direct, manage, monitor and control the project work, which is especially important in comprehensive residential development. Integration management also systemizes the practices related to organizations project portfolio management, which is known as investment process in the case company.

The integration management is also important because the project managers must continuously adapt to new situations. More information is gathered about customer as sales of a separate project phases are advancing. Furthermore, the business environment changes constantly and stakeholder- related time risks often materialize. Moreover, the work of many functional teams and subcontractors in a residential area development needs to be integrated to one focused project effort. Finally, the project and functional managers need always to widen the focus to the whole area and not just to separate phases.

Project scope management

In the project development stage target is to make investment proposals that will be accepted by the investment board. Therefore, the scope management focuses in project development stage on determining the required information in order to make sophisticated investment proposal. The required information includes plot conditions and market and business analytics of preliminary design concept. Architectural design is developed to the level, where sellable area, costs and price can be estimated adequately. Scope management knowledge area should give the tools and practices in order to determine when the architectural competition is the best strategy for creating design concept.

The scope management of design management stage could be divided into two subcategories: area and building design. Area design or master planning stage is where the scope of procurement and construction work is defined. Furthermore, the area design can be divided into four knowledge areas: buildings, infrastructure, parking and other common areas. Area design principles that affect project profitability like disturbance minimization during construction, phasing (see phasing management) and temporary parking and infrastructure solutions have to be also taken into account during area design. Certainly, the primary architectural focus areas like views, orientation, people flow, massing, recreational area

design, place making and wind and noise blocking are to be taken into consideration when determining scope targets.

Building design scope differs from the small-scale infill development project in spatial programming in two ways. First, the common areas like gym play rooms and playground can be designed to serve multiple phases. Second, the spatial plans have to be flexible as subsequent phases usually have varying demand.

In the procurement responsibility area, the procurement scope should be defined so that for instance ground works are procured as a large entity. In marketing responsibility area, the marketing scope should be decided carefully and creatively in order to raise awareness and interest

Project time management

The time aspect of phasing is an important CRD. It is separated to phasing management because I want to emphasize its tactical importance. Otherwise, time management is important during the planning stage when project is greatly cash flow negative. In order to minimize financial and opportunity costs, duration from plot purchase to commencement of construction should be minimized with proper time management. In marketing responsibility area, one best time management practice is to start area marketing at least 6 months before the commencement of the construction.

Project cost management

Objective of cost management is to identify ways for achieving the set quality level with lower costs. Therefore, area design costs related to parks and other common areas have to be managed so that their proportional costs in the unit price of apartment floor area stay below the target. To achieve the cost target, the infrastructure, parking and other critical solutions have to be usually reviewed and improved.

Project quality management

Construction and design quality should be always improving in every phase. If this is not occurring, then something is erroneous in communication and knowledge management.

Project risk management

Most important knowledge area in the project development responsibility area is risk management. Project development manager must always conduct comprehensive technical, legal and financial due diligence. There are many time, cost and building right risks that need to be identified. The Monte Carlo risk simulations should be conducted in order to understand risk probabilities related to business cycles and estimation errors. Identified risks should be mitigated with flexible plot acquisition agreements as determined in procurement management. Furthermore, flexible spatial programmes, small phases, housing type flexibility (rental, ownership), strong area brand and flexible procurement agreements all mitigate business cycle risks.

Project price management

The price management is specific knowledge area in the case company. It is important tactical element especially in multi-phased residential projects. After every phase, the apartment prices can be adjusted to meet the current price level of the market. In the case company there are sophisticated tools for estimating, monitoring and controlling apartment prices in various sizes and different floors.

Project procurement management

The economics of scale and flexibility are important in procurement for reducing costs and business cycle risks in CRD. Flexibility can be, for instance, achieved with negotiating purchase options with suppliers.

Project stakeholder management

During the project development stage, the stakeholder management is critical. As stated in chapter 2.5.3, achieving collaborative planning process requires effective stakeholder management. The stakeholder management in CRD context can be divided into six main

stakeholder groups: customers, public sector, business sector, financial sector, neighborhood and NGO's. Involving the stakeholders early into the development process will help to manage expectations, acquiring customer information, and lowering time risks by reducing complaints. The stakeholder management knowledge area also ensures that everyone in a project team is taking into account the customer needs and expectations.

Project communication Management

If stakeholder management addresses the issue of external communication, the communication management focuses on internal communication. The more complex the project is, the more critical the proper communication planning and execution is. Especially before and during the construction of the first phase the communication is critical for ensuring effective execution of following phases.

Project phasing management

Phasing management is a combination of scope, price, cost and time management. Area design should enable efficient market-based phasing. In Finland and CEE basis the optimal phase size is usually less than 50 apartments. In Russia, it might be several hundred. The phase size is optimized with three factors: amount of cash flow risk exposure, the local demand and construction costs. The larger the phase size is, the larger the risk impact is. Therefore, larger phase size increases risk exposure or in other words cost of risks as its product of risk probability and potential loss. The local demand determines the duration between commencement and the end of sales. Often it is optimal that all apartments are sold few months after the handover. The larger the rate of sales, the larger the phase size should be. Finally, to the certain limit, the larger the phase size is, the lower the construction costs are. Occasionally, it can be feasible to build two or more phases at once if demand is higher than expected and risks are controllable.

Commencement of the following phase is when duration to end of sales with the current rate of sales is optimal. Rate of sales is considered optimal when all apartments in a phase are sold

few months after a handover. Rate of sales can mainly be adjusted with price level and marketing. Optimal commencement interval is determined in the context of cost management and price management. Project costs related to determining the optimal commencement interval are construction and financial costs.

The Figures 19, 20 and 21 are for illustrating the factors that determine the optimal timing of commencement of the next phase in a residential area project. The graphs are based on a verbal description of the collected best practice in timing of commencements. These graphs are not accurate presentations of real life, and more studies have to be conducted in order to develop more realistic graphs.

There is a time when the next phase construction costs are lowest when starting the next phase (Figure 19, a), because of work overlapping optimization etc. However, the optimal commencement interval is not always the same that site management team suggests. If the next phase is too early, the amount of unsold apartments will increase financial costs, which is the sum of interests, opportunity costs and risk exposure costs. Interest costs are related to negative cash flow. Opportunity costs are also related to negative cash flow, but also take into account the lost profit related to company's average ROI. Risk exposure costs are related to unsold apartments and will reduce the company valuation. If the next phase starts too early (left form b) the stock of unsold apartments will increase, which will cause the increase of financial costs. Conversely, if the commencement of the next phase is later (right form b) the financial cost will be higher because the opportunity costs and interest costs are higher. It must be also mentioned that interest costs are highly dependent on overall cash flow situation, which is dependent on payment terms of the plot and project stage. The point “c” marks the next phase commencement time when its overall costs are lowest. The point “e” stands for the handover of the previous phase.

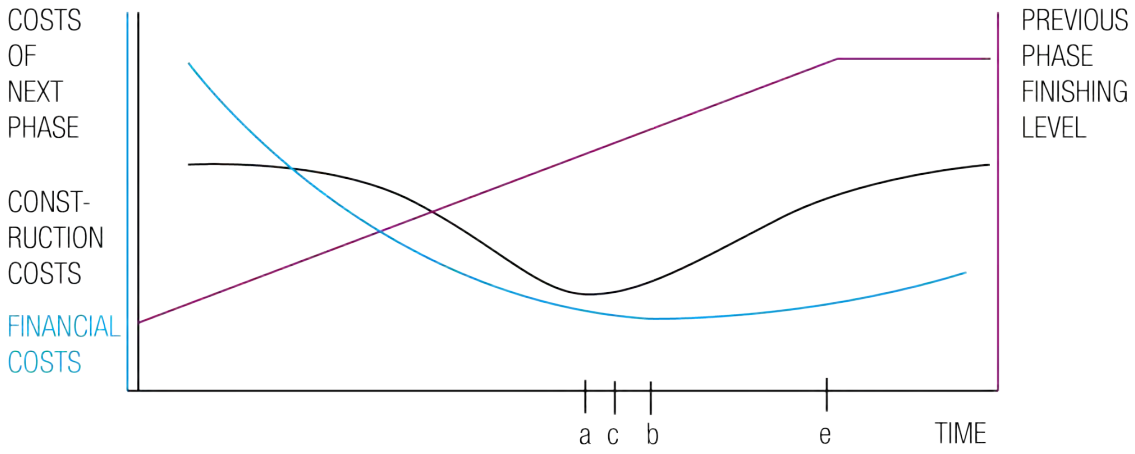

Figure 19: Optimizing the next phase commencement in relation to construction and financial costs

In the Figure, 19 price level is a constant. However, in order to reduce financial costs and increase the rate of sales, prices are often reduced in subsequent phases or fixed to the current level and not to counter of the effects of general price inflation. These price management practices can reduce profitability substantially. According the workshops, in order to determine the optimal commencement interval, the scarcity effect has also to be taken into account. In the Figure 20, the scarcity effect might be exaggerated, but it illustrates how prices slightly increase as the amount of unsold apartments reduces if the rate of sales is kept constant.

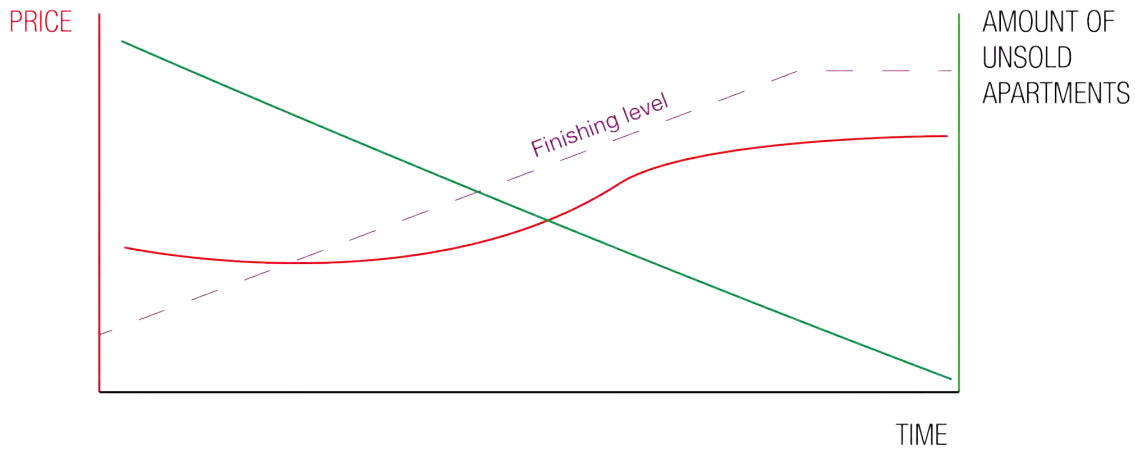

Figure 20: illustration of scarcity effect in residential area phasing management

The Figure 21 illustrates the theory that commencement time is not necessarily optimal when total costs (interests, opportunity, risk exposure, and construction costs) are lowest (f). In order to determine the optimal commencement time, the scarcity effect has to be taken into account. The optimal commencement time according to this hypothetical graph is point “g”, where the difference of costs and the price is largest.

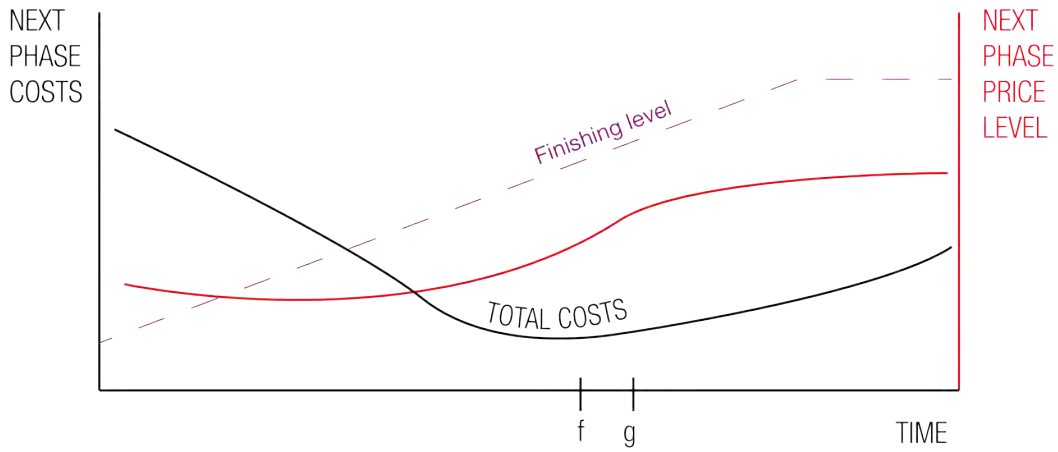

Figure 21: Optimal commencement time of a phase in CRD

Project human resources management

Acquisition, development and management of project teams are important subknowledge areas. Therefore, the planning of human resource management is particularly important sub-process in a residential area development. As the complexity of the project increases, the demand for competence, special skills and work hours surges. Furthermore, it is challenging to keep project team committed throughout the project that might last even 10 years. The commitment and motivation reduce changes in a project team, which in turn ensures successful project knowledge management. In small-scale infill development, the human resource management in the case company is quite straightforward. As the residential area project often consists of a multiplication of few apartment block types, the project team has to be constantly improving the construction process and develop the designs with a design team. Therefore, in the residential area development the knowledge area is a critical success factor.

Project safety management

The case company has been focusing on safety management, and it is quite well understood and documented knowledge area. During the workshops and interviews I did not ask any explicit best practices related to safety management of a residential area development project. The collection of best practices related to safety management of a residential area development project will be part of the further studies.

Project knowledge management

The more the project performance increases between phases, the better the knowledge management practices are. The knowledge management is closely related to communication management and yet, the knowledge management is more learning-oriented approach to information exchange. The knowledge management knowledge area ensures that the essential learning is maximized. Furthermore, the project team should be long-term oriented in corporate competitiveness and not just focused to the project at hand. In other words, the project team should establish practices that ensure that the most of the valuable knowledge created during the project is later accessible for the personnel outside the project team.

Project Research & Development Management

In the automotive industry, the Research & Development is conducted mainly with prototypes. Conversely, in the construction industry, the research & development is often integrated to production processes as every project is a development of prototype. Therefore, it is important to systemize and integrate the R&D practices to the project management. During every development project and phase one incremental improvement or radical idea should be tested. The testing should be systemized so that it is initiated, planned, executed, monitored and standardized for the use of other business units. Moreover, if the residential area project R&D management is successful it will increase positive differentiation and support marketing. The project research & development management is connected to all other knowledge areas but is mainly in combination of practices related to scope, knowledge and brand management.

Project corporate brand management

The corporate brand management is increasingly important factor in achieving competitive advantage because communication of positive and negative experiences has increased substantially through social media. As in project knowledge management, the increase of long-term thinking has been the motivation in adding corporate brand management to the knowledge management framework. The knowledge area target is to ensure that the project team does not just focus on profit margin, but seeks for creating long-lasting customer relationships and brand value.

As in communication and knowledge management the stakeholder and corporate brand management have different approaches to the same objective. Stakeholder management has project focus whereas corporate brand management has a long-term brand value focus.

4.3 SUGGESTION ON INCORPORATING BEST PRACTICES INTO YIT'S PROCESSES

The YIT's strategy is well-managed and profitable growth. Implementing companywide best practices efficiently is essential for managing growth profitably and without too large risk exposure. Incorporating the best practices is important in establishing business in new cities and countries. Training, employee exchange and investment control are all important implementation practices, but more systematic approach is required.

In the short term, the best implementation approach is probably incorporating collected best practices into current training programs and utilizing the created knowledge framework. Utilizing the knowledge framework in training will increase understanding about the various knowledge areas related to CRD. When the training of best practices is structured into the knowledge areas the project personnel achieves the complete understanding of the success factors of CRD. Furthermore, the knowledge areas could be integrated eurrent activity system so that the categorization of documents follows the knowledge framework model.

In this study, I do not only focus on incorporating the collected CRD best practises into YIT's processes, but on creating a long-term model for knowledge and process management

of speculative property development. In theory, every successful project should start with the end in mind; the development of effective knowledge utilization system will improve social processes and support knowledge externalization and combination in knowledge sharing projects such as the current best practices in Comprehensive Residential Development project.

There have been failed efforts in incorporating systemic companywide knowledge management practices into development processes of the case company. According to interviews many programs have failed because they have been too complex, they have demanded too much work and there have not been proper tools for managing the knowledge.

To address these challenges, I sought to create simple and adaptable model for collecting, categorizing and incorporating best practices systemically in the case company. I have taken a process management approach to the knowledge management because essentially every best practice, from process managers' point of view, is a suggestion or an idea about how the current product, service or process can be improved. For example, if the business unit's process idea has adequate return of investment, it will be integrated to concern's process management model.

In addition to training programs, the concern's investment process is currently the main method of process management and implementing best practices. In order to get the next stage of a project approved, project managers have to show what best practices have been and will be implemented. For example, the required stakeholder management plan indicates that the project manager knows the best practices of managing stakeholders successfully. However, it does not indicate that project managers understand the real value of stakeholder management. Therefore, training is important for ensuring full comprehension of certain best practices.

We have created a theoretical model for cloud-based information tool for supporting active and passive learning and project management. According to interviews, it has been identified that best practices in a form of documents such as handbooks are not well adopted. Therefore, integrating the knowledge management into process management system will enable continuous learning and development of best practices. The target is to create an enhanced

version of current activity system, which is mainly project management tool repository. Activity system has also been important information source for new employees to learn how the development projects are managed in the case company.

4.3.1 DEVELOPMENT OPERATING SYSTEM

As it has been stated earlier, the development operating system is essentially new version of the activity system currently used in Finnish subsidiaries. Development of new technologies like HTML5 and cloud computing have made possible to develop sophisticated but simple information tools for construction project management. It will extend the mind's capacity to understand complex systems as a whole like geographical maps helps us understand the living environment. Development operating system will make possible to visualize the entire process at once; a view comparable to the world map. Furthermore, it helps to understand the key knowledge areas that ensure the project short-term and long-term success; a view comparable to a national map. Finally, it will assist in understanding the key deliverables and subprocesses within the knowledge area; a regional map. Later, it will make possible to see even more detailed view of project geography by showing the detailed and customizable tasks within the key deliverables and subprocesses; a city map.

The DOS is based on knowledge framework created for the best practices of CRD knowledge sharing project. The DOS is an interactive system where necessary information and documents are found quickly. Ideally it is a learning, communication and project planning tool for project teams. The project process development and knowledge management personnel would benefit from it by having a system where best practices are stored. Furthermore, they would be able to address key problem areas by developing the unified process models. Moreover, the adequate cooperation and information sharing is critical for project performance. If the task management and commenting features are integrated to the DOS, it will help project teams to communicate and track one another’s progress more efficiently. Another possible feature is project decision tracking, which allows essential project decisions to be stored in the DOS. Ultimately, this feature would enable performance tracking of certain decision and would indicate best alternatives. For instance, it would help

us to allocate the optimal amount of resources for improving attractiveness. The figure 22 illustrates the project overview page in the DOS. It is not a full illustration of the system as the full interface design is beyond of the scope of this master's thesis. However, the target of the figure is to show how the knowledge framework can be integrated to the process management system. The purpose of the illustrations is not to show optimal process map as optimal process map depends on the project and project manager's management style. However, purpose of the illustrations is to show the potentials of the DOS.

The limited space for process illustrations is one of the problem areas that DOS tries to solve in the web browser interface. In the figure, the project management knowledge areas are presented as discrete processes with defined interfaces while, in practice, they overlap and interact. The DOS will enable users to see how the different knowledge areas are interacting.

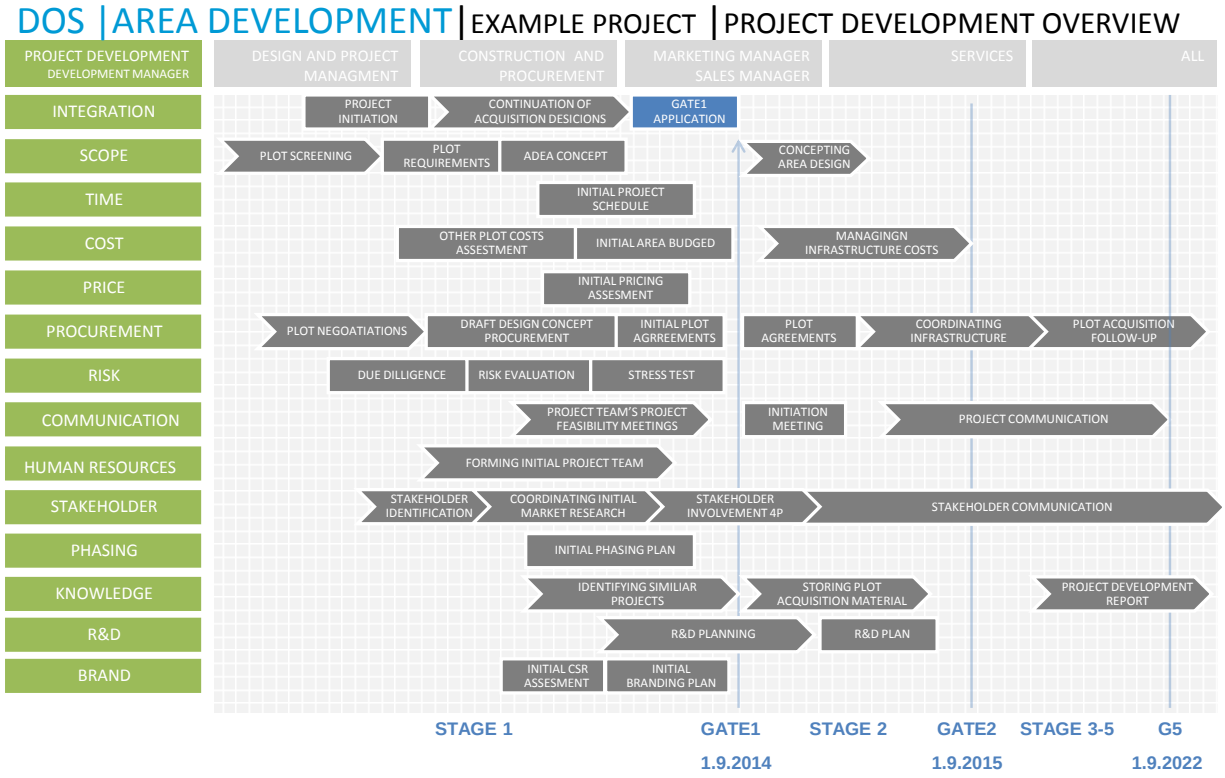

Figure 22: the demonstration of the project development overview page in the DOS

In the left column, there are the key knowledge areas. The quality and safety management are not in the list as there were not any related best practices collected during the workshops and interviews. The responsibility areas are in the top row and the time dimension can be seen in the bottom row.

The responsibility area dimensions in DOS should be adaptable to the business environment and business unit's resources. For example, addition of the project calculation responsibility area should be as easy as possible. Furthermore, the addition or removal of other project management dimensions including project types, project category, knowledge areas and stages should be as easy as possible. Figures 23 and 24 illustrate the Design and production management overviews in DOS. The knowledge areas (in left column) adapt according to the responsibility areas and manager's needs.

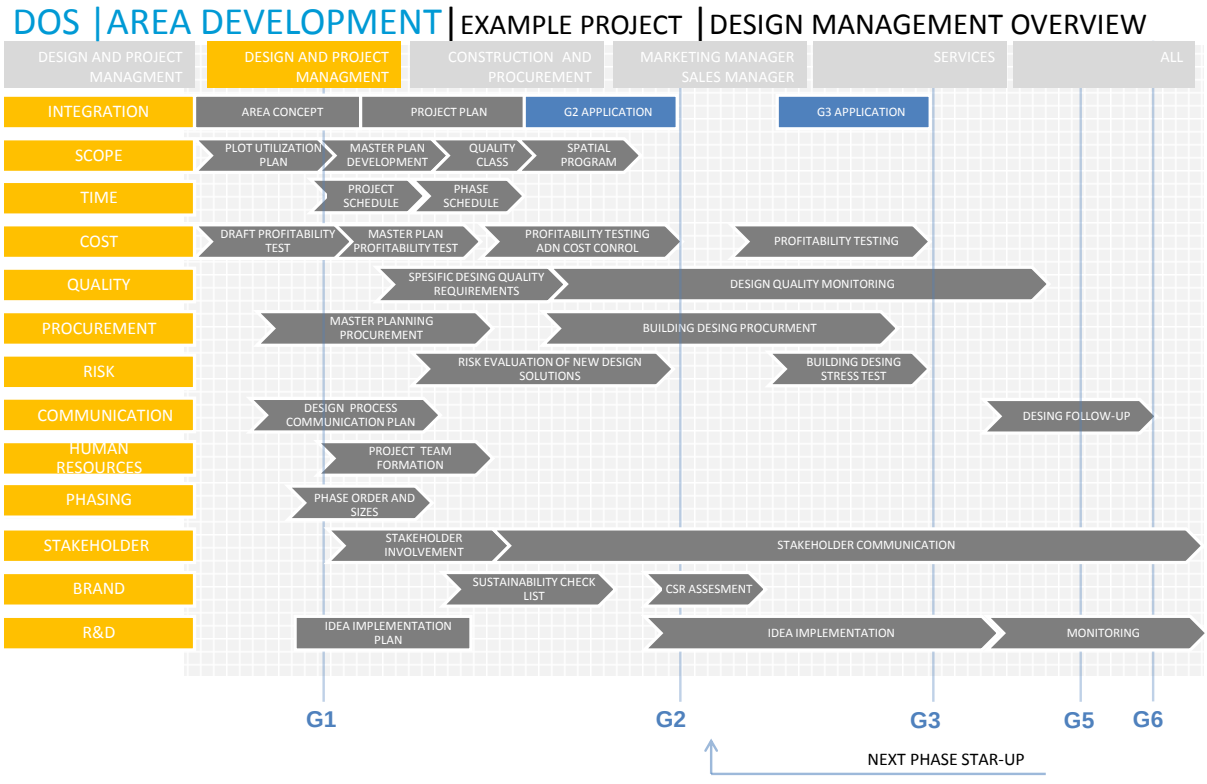

Figure 23: the demonstration of the Design Management overview page in the DOS

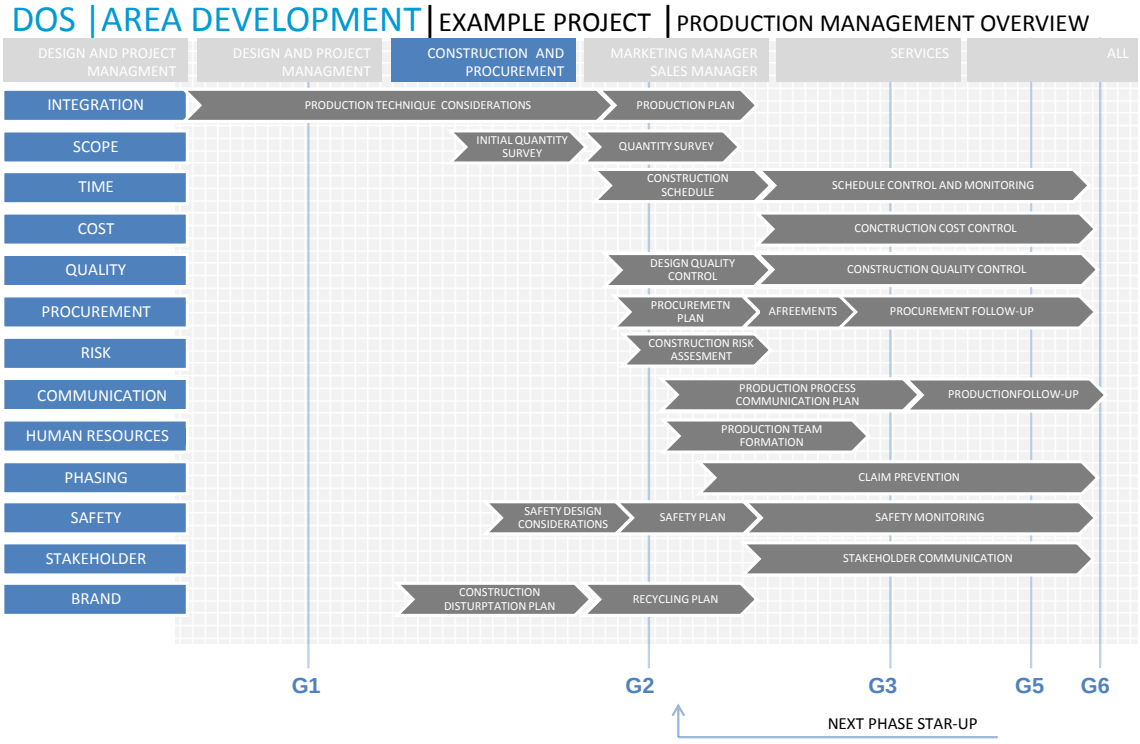

Figure 24: the demonstration of the Production Management overview page in the DOS

The rectangles in the middle of the chart demonstrate the deliverables of the project stage. The blue box illustrates the G1 application, which is a key deliverable of the stage. The other deliverables are included into the G1 application in some way or other. The arrows present subprocesses of the stage. A subprocess is a set of activities that have a logical sequence that meets a clear purpose. For example, the plot screening subprocess is a series of initial investigations of plot acquisition leads.

There are also targeted dates of the project gates in the figure 22. As the development manager creates a project in the DOS, he or she will select the project template and input basic information of the project like amount of building right and initial schedule. The dates and other information are updated as the project advances and the key deliverables and subprocesses align accordingly. In the HTML5 environment, the key deliverables and subprocesses can be dragged and dropped to meet the project needs. For instance, if the initial market survey has to be conducted before initiating the plot negotiations the

development manager can drag the initial market survey deliverable and drop it before the plot negotiation subprocess. Moreover, if there are unnecessary key deliverables and subprocesses, they can be deleted from the current project plan. For example, if the landowner requires that a certain design concept and branding are used in the plot, the project development manager can ignore all related key deliverables and subprocesses when creating an area concept.

Every string of a text presents a link to another set of information in the figures 22,23 and 24. For instance, a user can focus to one knowledge area or stage at a time. Furthermore, as the DOS is a hierarchical information system a user can find additional information about every key deliverable and subprocess. If subprocess link is clicked, it will open the new process map where the subprocess is illustrated as a sequence of deliverables and personalized tasks according to the user's responsibility area.

The figure 25 demonstrates one possible interface of scope management of services responsibility area. There is a short description of the key deliverable and a link to the full description. There are also links to other input documents created in other responsibility area or previous stages. Furthermore, there are links to template documents or web forms, where collected and processed information is saved. Finally, there is a link to suggested task list, where key deliverable execution is reduced to a sequence of simple tasks.

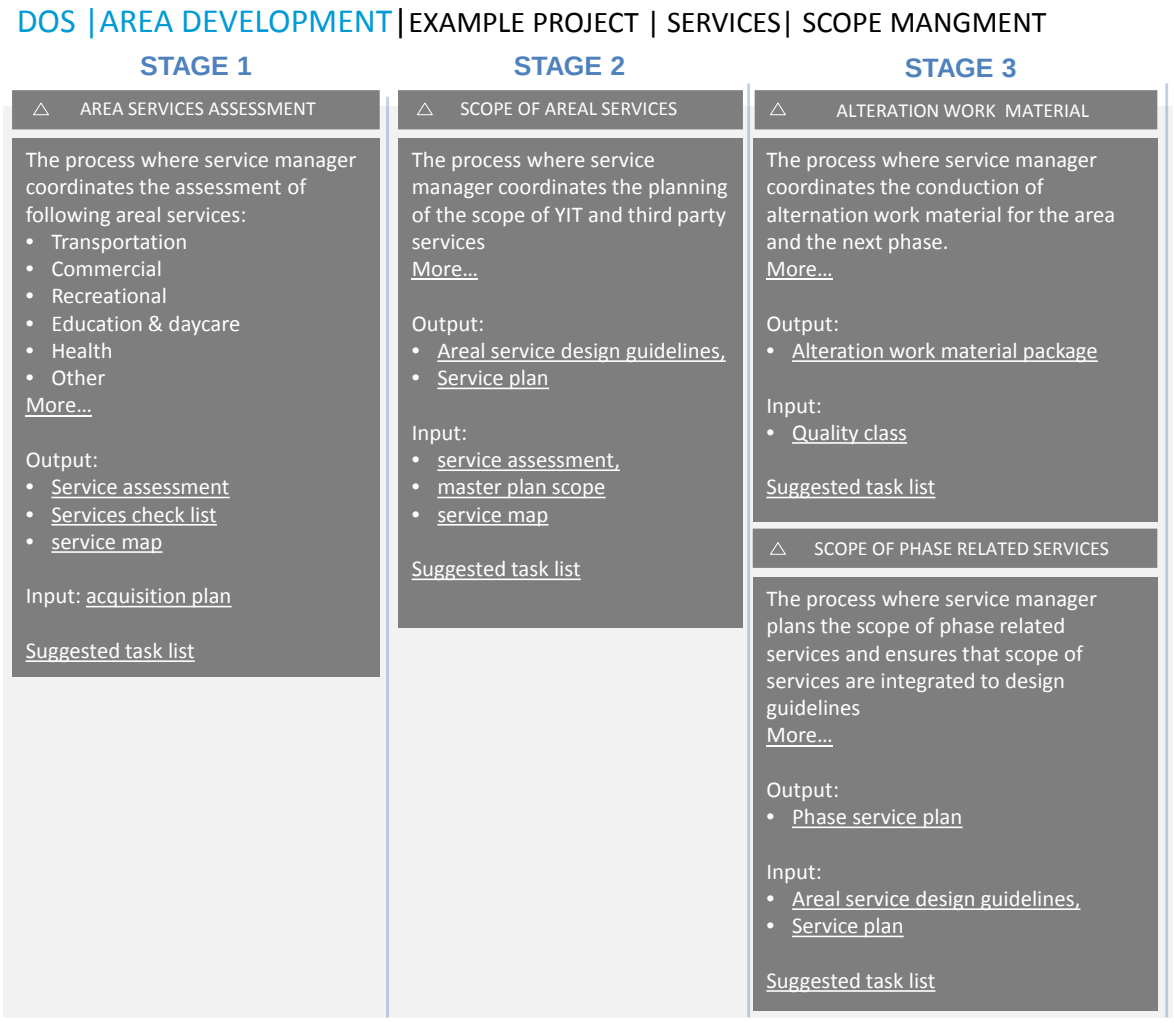

Figure 25: Demonstration of the knowledge area page in the DOS

The DOS might seem complicated with its entire feature set, but it is developed gradually to match project teams' learning curve. All the externalized information in the DOS will be stored during the several years and will be updated regularly as it is an active project management, document repository and investment process information tool.

The hypothesis is that The DOS will be highly beneficial for the case company when all the management aspects are incorporated to one information system. There are numerous challenges in developing DOS. Greatest challenge is lack of resources. To address this case company could seek strategic partnerships with software developers and establish a joint venture for the development of the DOS.

4.4 SUGGESTIONS FOR MANAGING COMPREHENSIVE RESIDENTIAL DEVELOPMENT KNOWLEDGE

Based on quantity and quality of collected best practices, the responsibility area based approach exceeded the expectations. In the future the best way to externalize and combine knowledge might be through knowledge sharing projects, which focus only on one knowledge area or one combination of responsibility and knowledge area at the time. For instance, one focus area could be construction quality management. During the knowledge sharing project, the local construction managers and other personnel who are responsible of construction quality forms unified opinion about local best practices. These local best practices are then shared with the knowledge management project team. The knowledge management project team of senior managers will identify the companywide best practises and make some of them mandatory through investment process.

Another way to collect best practice is to utilize an internal idea collection model – Generator. In Generator model, everyone in the case company is encouraged to share ideas related to various challenges. Current idea challenge is for improving construction quality. The idea management team is established for every challenge, and it will categorize ideas and identify potential best practices to be implemented. The generator model is ideal for collecting potential best practices related to knowledge areas and at the same time for familiarizing the knowledge framework within the case company.

The Development Operating System enables active best practice collection and validation. Any changes that project teams make to the project development template in the DOS can be identified as a potential best practice. Conversely, if the project teams constantly ignore some voluntary key deliverable or subprocess the removal of best practice status can be considered.

Utilizing the full knowledge framework may improve the adoption of the best practices. If the Development Operating System is developed, the performance of a new project management idea is monitored and integrated to unified processes.

4.5 BENCHMARKING BEST PRACTICES IN COMPREHENSIVE RESIDENTIAL DEVELOPMENT

Most of the collected best practices are based on intuition and, therefore, lack proper scientific proof. However, decision makers use intuition in decision-making process and use of intuition can be recognized, and there can be ways in developing or fostering the use of intuition (Hyppänen 2013). The senior project manager can weigh in all the factors influencing the project outcome and intuitively estimate the effect of certain practice used during the process. Certainly, the inductive reasoning can fool us, but during long-term iterative evolution of project management process, wasteful practices might be removed and best practices persist. Furthermore, impacts of some practices are easy to measure because they have a direct influence to certain key performance indicator. For instance, some safety measures directly impact to the amount of lost employee work days. However, it might be more challenging to measure accurately how the safety measures impact to the project financial performance.

If the Development Operating System is developed, we might be able to accelerate this project management evolution. Algorithms are able to analyse increasingly large chucks of data, and we are able to see patterns in the project execution data. We can separate signal from the noise and have scientific proof that some practices statistically enhance project performance. Especially, if we integrate the R&D knowledge area in the project management process we are more able to AB test various practices and product ideas. For instance, the impact of increased investment to stakeholder management is tested in two similar phases A and B. In the phase A only the stakeholder management will be changed compared to the phase B. If the customer feedback and overall performance have increased in the phase A, it will give us the initial signal that investing to the implemented stakeholder practices is beneficial.

The problem is that there are never two identical phases, let alone two identical CRD projects. However, if we have a tool for tracking project management process and the decisions made during the project, we could have the possibility to identify from the large pool of projects best practices and optimal decisions. The Development Operating System could potentially be

the tool for creating so called pool of data needed for obtaining scientific proof that best practices are really best.

In conclusion, I was not able to gather all necessary data for the comprehensive analysis of the impacts to the project costs, sales prices, pace of sales and development time related to the location of the area. However, further development of benchmarking metrics and databases is continued after this Master's thesis. In this stage of the project, I wanted to find intuition-based best practices to be later analytically and scientifically proved as real best practice. Comprehensive residential construction projects have enormous amounts of factors that influence the long-term share value and short-term project profitability. However, continuous development of web-based information tools and big data processing technologies will eventually help us to bridge the gap between guessing and knowing.

Finally, according to Vanthournout, Olson and Ceisel in their Accenture case study Return on Learning: Training for High Performance at Accenture (2008) the ROI of Training is challenging to estimate. However, they were able to approximate combined effects of training to performance, retention and recruitment and then calculate the net benefits. They divided the net benefits by total costs of training, which resulted in 353% of ROI.

Utilization of information technology both in organized and self-learning has been essential for achieving the high returns in training. "The deployment of global learning management system was a critical factor in the entire success story of reinventing learning at Accenture" (Vanthournout et al. 2008) Even though, the Accenture employees might be more able to adapt to knowledge and process management systems like DOS, the results in Accenture encourage to invest in training systems.

If learning in Accenture resulted in improved organizational performance, it should be also studied in the case company. In YIT, the learning effects of the framework and DOS can be experimented with individual project management tests. In the research setting, the employee training is organized in multiple groups. If the tests results are improved in groups where the knowledge framework and DOS is utilized, we have initial proof that the suggestions should

be deployed fully in some business units. Finally, if there are some statistically significant performance improvements in these business units, the full deployment should be considered.

5 CONCLUSIONS AND SUMMARY

5.1 CONCLUSIONS

This Master's thesis is part of the internal knowledge management project at a Finnish property developer, YIT. The aim of the project is to increase ROI in Comprehensive Residential Development (CRD) projects through increased corporate knowledge. During the project I collected and identified local best practices used by YIT in residential area development. The target of my Master's thesis is to create systemic and long-term model for CRD knowledge management. First I collected and studied local best practices in every business units. Secondly, I created taxonomy or a framework for knowledge management, based on analysis and theoretical framework. Finally, I developed a systemic concept for a Development Operating System, which is cloud based CRD knowledge management system. It is a model for managing best practices continuously, where functions of project management, document repository and process management are integrated.

The comprehensive residential area development business is important for the case company. For instance, about 2/3 of Finnish business division's housing development revenue is from residential areas. Rest of the revenue is from small-scale infill development projects. However, the business environment of speculative CRD is a highly complex system and needs a different approach than separate infill development project. In the process development point of view, the focus has been on separate phases. Therefore, the development processes of residential areas need a separate model for constant and holistic improvement of processes through companywide and industry best practices.

The workshops, interviews and the collected best practices indicated that there is always plethora of uncertainties, risks and stakeholders needs involved in large-scale urban development projects. The planning authorities and city governments increasingly have more long-term objectives for the development of urban environments. Developers in Europe are not anymore able to procure designs of one block of flats and copy and paste the same

economic design around the area. Furthermore, the social and environmental sustainability are increasingly important in democratic city planning. Moreover, it is essential for developers to maintain adaptability to increasing complexity caused by changes in the business environments.

Holistic development approach is needed for solving challenges emerging from the increased complexity of CRD. Price and cost risks have to be managed in every stage of the project. However, plot acquisition is most critical stage when good decision has to be made. Moreover, in order to make a good decision the information used in risk analyses and feasibility studies has to be reliable. In order to have reliable information for the estimations and risk assessments, it is necessary to have established practices for measuring and controlling projects performance and managing project knowledge.

The time and brand risk emerging forms the negligence of stakeholder needs and concerns are a significant problem in the residential area development. Practicing the stakeholder management early in the development process and contributing to the formation of partnerships with the public and people will reduce the time risks and increase brand and design value.

The construction disturbances and unattractiveness of the unfinished residential area are factors that have to be taken into account in the planning stage. The phasing management knowledge area ensures that the whole area is not construction site, but the finished buildings form an enclosed area where construction disturbances are mitigated. Successful planning of temporary solutions for parking, fencing and infrastructure also ensures livability in the area.

The development of social and technical infrastructure is often the one of the most challenging management area in CRD. Especially in Russia the uncertainties related to social infrastructure and junction costs is a significant problem area when conducting feasibility studies. I collected plenty of practices that mitigate risks related to infrastructure in every stage of the project. However, the stakeholder and procurement management in the initiation stage is most important knowledge area for understanding and mitigating the risks.

The holistic process management approach to a residential area development not only helps solving challenges, but also create opportunities for increasing quality-cost -ratio. In other words, the CRD projects have many opportunities for increasing quality with relatively small costs increases. For instance, the common facilities that serve the whole area like high quality saunas, gyms and playgrounds are often feasible in CRD projects.

Area services coordination is a great opportunity for increasing quality in large-scale residential areas. Customers increasingly value good transportation connections and areal services like parks and shops. That is why the case company seeks plots near good connections and develops housing company homepages that will help customers to benefit from the local services. However, currently there are no externalized practices for coordinating third-party services efficiently despite the stated opportunities in the case company.

The optimization of parking solutions is also an opportunity in CRD. Currently, cities require more parking places to be constructed than there is a demand and often dictate the used parking solution; parking garage, underground or overground parking. However, in residential areas there are possibilities, like shared parking, for optimizing the development of the parking places, as one the best practice from Lapland business division highlighted.

Not just cities benefit from the residential areas with distinctive identities, but developers are able to increase customer awareness and interest towards the developed area with effective branding. According to the interviews, the customers value greatly the identity aspect of living area. Therefore, well-known, distinctive and positive identity is a significant quality factor in residential areas. The initial stage of residential area marketing, branding, is focusing on the creation of a distinctive theme for the area and translating it to urban design and services concept. For instance, the theme of the Konepaja by YIT described in chapter 3.4.1 was Industrial nostalgia and replication of the identity of the Dockside in London. Some of the best practices suggested that early in the development process the full project team invests in the creation of clear vision and theme for the area and acquires help from branding professionals.

Correspondingly, the cost reduction is a great opportunity in large-scale projects. Procurement costs are decreased because economies of scale. The incremental improvement of design details and construction team's learning through human resource and communication management reduces the construction costs phase after phase. Furthermore, the unit price of the plot is also often lower in large-scale projects, and the design costs can be reduced as the basic design outline can be often replicated. Finally, the commissioning guidance and guarantee repairs can be organized more efficiently in the residential area projects.

Learning during the project does not just decrease costs, but creates a possibility to manage prices as understanding of the local market conditions increases. Apartment programmes can be altered to meet the current demand, and the commencements of phases can be rescheduled for maintaining the scarcity effect and reducing financial costs related to unsold apartments.

The comprehensive residential area projects are also great opportunities for testing innovations and practices. The effects of new ideas to the project performance can be measured more accurately in multiphased projects than in small-scale infill development projects. Distinctive identity can often be achieved through new product, service or process ideas, which makes residential areas ideal for research and development.

Full exploitation of the opportunities and adequate response to the challenges demand increased systematization of the development process. The development process includes following key processes or responsibility areas: project development, project management, design, procurement, construction, marketing, sales and services. Furthermore, the processes consist of sequences of good or best practices. The best practices are needed for creating processes that ensure the best possible project performance especially in complex projects such as a residential area development.

Increasing bureaucracy through corporate project financing is one approach for process management and for ensuring that some of the best practices are utilized in business units. Bureaucracy is needed because of Not-Invented-Here bias and typical change resistance in the construction industry. However, the more long-term strategy is, the more is to be invested in project management training, incentivising voluntary adoption of best practices and

developing tools for active and passive learning. In other words, YIT should start investing more in implementation of knowledge management practices and related tools that are integrated to organization's and project management processes.

We have created a CRD knowledge framework for supporting knowledge management and especially enabling adoption of best practices through passive and active learning. The active learning is occurring in training sessions and self-education in Development Operating System. The DOS would be an internal knowledge repository and online service for process, project and knowledge management. As DOS would be used as a part of active project planning tool, the passive learning of best practices is taking place.

The DOS interface is based on the three dimensions of the suggested knowledge framework: Responsibility areas, project stages, and knowledge areas. The Responsibility areas dimension is based on the case company's existing functional areas. The calculation and housing company administration functional areas were not included to the initial framework because they were ignored in the knowledge management project. There are home alteration service functional areas in the case company, but I have extended the service responsibility area to include also coordination of areal services. The time dimension is also based on the case company's project portfolio management process. However, the Project Management Body of Knowledge framework is a foundation for the CRD knowledge framework. The framework is modified based on collected best practices and identified special target areas of successful comprehensive residential project. For the initial knowledge framework, I selected following 16 knowledge areas.

1. Integration management – Target is to exceed stakeholder expectations
2. Scope management – Target is that necessary and only necessary work is done
3. Time management – Target is that we always know when a work is done
4. Cost management – Target is that costs are known and under control
5. Quality management – Target is that the quality level is as determined

6. Risk management –Target is that project risks are always under control
7. Price management – Target is optimal pricing of products and services
8. Procurement management – Target is optimal acquisition of resources
9. Stakeholder management – Target is that stakeholder needs are understood and then implemented and communicated back efficiently
10. Communication Management – Target is that the project team's information flow is adequate
11. Phasing management – Target is that the scope of the phase and commencement order and timing is optimal
12. Human resources management – Target is to maximize motivation and competence of the project team
13. Safety management – Target is that there are no events that can harm health.
14. Knowledge management – target is that progression of cross project performance is maximized through learning
15. Research and development management – Target is that the product, services and processes are improving constantly through new ideas
16. Corporate Brand management – Target is that organizations brand value is increased during the project

The DOS makes storing best practices convenient as they can be easily added to the three-dimensional process model of project management. The learning of project management is enhanced because best practices are seen in the context of responsibility, time and target. In the DOS, the project team is able to see the progress of the project and find easily needed information and tools for advancing the project. To conclude, the DOS is much required

platform for overall project process and knowledge management. In addition, it is an active project integration tool for project teams.

One of the main targets of the residential area knowledge management project was a creation of the cookbook for the successful residential area. The book format changed to the interactive environment of DOS, because of enhanced usability and adoption. However, the figure 26 illustrates the knowledge framework using the cookbook analogy. The target is to create residential area that is economic, safe, functional, healthy, communal and attractive. Moreover, the area should have a good reputation and services and strong positive identity. In order to achieve these qualities, there have to be one master chef and many other cooks that have different responsibility areas, like preparing main course or dessert. The cooks have to use the same core skills like knife use and seasoning in different ways in different courses to achieve the perfect menu.

Figure 26: knowledge framework and customer perspective

The analogy is not perfect because in order to prepare the perfect menu, the kitchen team have to utilize almost all project management knowledge areas as in CRD. Better analogy could be found in connection between language and learning. The project management language is

little utilized in the case company. However, the mastered vocabulary shapes the world view and helps us to understand complex systems and organize them into processes. Most importantly, the extended project management vocabulary helps us to enhance knowledge management and organizational learning by dividing the project into small and manageable subtargets.

There will be difficulties for ensuring that the benefits of implementing knowledge framework and DOS are understood. Therefore, I will share one more analogy, which is from the competitive sailing. As in development a project team, everyone in the sailing crew has a certain responsibility area: a helmsman, main sail, spinnaker etc. The tasks vary depending on the stage of the competition: the start, the approach and the end. The main targets or knowledge areas are boat speed and race tactics. However, the effective manoeuvres and trimming requires that the boat speed knowledge area is divided into more manageable targets. For instance, keeping the rudder straight, optimizing the helm balance and maintaining the pointing ability are subtargets of maximizing boat speed. Furthermore, the safety of the crew, race tactics and equipment preparation are all knowledge areas that the sailing team also has to manage. Often everyone in the winning crew understands every responsibility and knowledge area in the boat and seeks to improve the teamwork systemically and holistically.

5.2 SUMMARY

This Master's thesis was part of the internal knowledge management project at a Finnish property developer, YIT. The aim of the project is to increase ROI in Comprehensive Residential Development (CRD) projects through increased corporate knowledge. I collected and identified best practices used by YIT in residential area development, and created an implementation model based on them.

We organized workshops and asked professionals in each business division to share their best practices related to their areas of responsibility. The participants were instructed to share their expertise in relation to a particular project target, such as lowering risks or improving quality. Later, I refined these target areas to 16 knowledge areas of a residential area development.

We observed that the best short-term solution for implementing best practices was though increasing bureaucracy in corporate level project financing and related training. However, the aim of this master's thesis was to create a long-term model for knowledge management, especially for the implementation of best practices. In order to fulfil this objective, I had to gain deeper understanding of the current best practices and key knowledge areas in CRD project management.

Key to a long-term solution for corporate knowledge management of CRD is the establishment of the knowledge framework for project management. In order to build a scientific foundation for said knowledge framework, I consulted theoretical literature on system and process thinking and knowledge management. Moreover, I studied sample of variations in the business environments of speculative residential development. I also researched the common best practices of the industry, as well as the Project Management Body of Knowledge. For the master's thesis, I conducted an empirical study in current practices in project management and researched key variations in project types. Finally, I studied successes of, and challenges in, 34 recently completed or ongoing residential development projects.

The CRD knowledge framework included three process management dimensions: responsibility areas (human dimension), project stages (time dimension) and knowledge areas (project target dimension). The eight Responsibility areas and six project stages are mainly based on the current process management framework in use at YIT. However, the 16 knowledge areas are based on industry best practices and the empirical study of the problem areas. The most important knowledge area specific to residential area development is phasing management, which is a process of optimizing the scope of phases and commencement order and timing of the phases.

In order to ensure the adoption of knowledge management in organisation and the best practices' implementation for the long term, I created an integrated model for process and project management that is based on the knowledge framework. The suggested Development Operating System (DOS) is a model for an interactive web-based knowledge, process and project management system.

5.3 CRITIQUE OF THE STUDY

First of all the setting for this study was challenging. I was appointed as a resource in the corporate knowledge management of CRD project and at the same time to write a master's thesis from chosen topic. It was hard to find the research question that would be within the scope of Master's thesis in construction economics and management. Moreover, there were not actual research questions and targets given to me that would fit in scope of Master's thesis. Furthermore, in the beginning my role in the project team was mainly organizing workshops and writing memos rather than doing any research. At the start, my research contribution seemed unclear, and I changed the research plan several times.

Finally, I started researching in the field of knowledge and process management and developed the final research plan based on these fields of research. I consider myself as a quickly learner in the area complex systems, and I wanted to utilize that ability in creating a long-term solution for knowledge management of CRD. It was overly ambitious goal for master's thesis, but I also knew that I was up to the challenge.

Now, as I know the knowledge areas in CRD, and I would have liked to take the easy way out, I would have narrowed the scope of the thesis to one of these knowledge areas. The scope of the study was too large for master's thesis. I had only time for scratching the surface of the research fields presented in the theoretical framework. It felt impossible to build a comprehensive systemic model for knowledge management of complex projects and in same time do traditional Masters' thesis and develop and test true best practice of comprehensive residential development. It is like Carl Von Linné would have tried to include his thesis on *plant sexual reproduction* to his *Species Plantarum*

I would have also liked to analyse more carefully the residential area development projects that I studied during the knowledge management project. However, the general learnings from the case studies were presented quite well in the Konepaja case study. Furthermore, I had to exclude large quantities of information related to the Konepaja –case. Therefore, I recommend that further studies will be conducted after the project is finished. Also, the analysis of the differences in business environments was not as comprehensive as I would

have liked. The general feeling is that great amount of valuable information had to be left out from the study report.

One of the largest problems during the research was finding relevant information related to CRD. I could not find any industry best practices related specifically to the speculative large-scale residential development. Another problem area was vocabulary. Substantial amount of time was used for ensuring correct translations of the terms used in internal processes.

5.4 SUGGESTIONS FOR FUTURE RESEARCH

There could be 768 (8*6*15) research questions based on the knowledge framework. For example, what are the best scope management practices in project development responsibility area in the planning stage? Best research result could be achieved when focused on one knowledge area and responsibility area at the time. Appropriate focus could make possible testing the best practices and integrating them to the development process.

The variations in CRD should be studied more comprehensively. For example, the project size, customer segment, role of plot owner, planning status etc. creates variations to the overall development process. The further development of Development Operating System is also needed because it would make implementation of future research much easier.

The residential project portfolio management is also interesting research area. Managing and optimizing the project portfolio so that risk exposure is optimal is an interesting challenge. Furthermore, the challenge of ensuring that project estimations and analytics are reliable enough is also worth studying.

Another important research area is international variations and political, economic, social, technological, environmental, legal, ethical and demographic changes in business environments. We should know the best practices for ensuring adaptability of the processes to the changes in business environments. Especially the business cycles are the greatest problem area in real estate industry. There is demand for researching the best practices in the portfolio and project management for lowering the risks related to economic cycles. Also, exploitation of the economic cycles should be studied further.

LIST OF REFERENCES

Laamanen, K. Tinnilä, M. 2009. Prosessijohtamisen käsitteet. 4. uudistettu painos. Espoo, Suomi: Teknologiateollisuus Oy. 156 s. ISBN 978-952-238-000-5.

Jauhiainen, J. S. Niemenmaa, V. 2006. Alueellinen suunnittelu. Tampere, Suomi: Osuuskunta Vastapaino. 292 s. ISBN 978-951-768-190-2.

Majamaa, W. (2008). *The 4th P - People - in urban development based on Public-Private-People Partnership*. Espoo: TKK Structural Engineering and Building Technology Dissertations.

Pesic, A. (2010) Project-based planning development - integrated design process and management. Aalto University School of Engineering, Industrial Engineering and Managemen, Espoo.

YIT (2011), Financial review 2011

Herranen, T. 1997. Helsingin historia vuodesta 1945; Kaupunkisuunnittelu ja asuminen. City of Helsinki, Helsinki

Raine Mäntysalo & Inger-Lise Saglie. 2010. Private Influence Preceding Public Involvement: Strategies for Legitimizing Preliminary Partnership Arrangements in Urban Housing Planning in Norway and Finland. Plannnig theory & practice. Volume 11. Issue 3.

Mäenpää P. Aniluoto A. Manninen R. Villanen S. 2000. Sanat syventyvät kaupungiksi. Tutkimus Helsingin kaupunkisuunnittelun prosesseista ja ihanteista. Espoo

Tynkkynen V-P. 2006 Aluesuunnittelu ja kestävä kehitys Luoteis-Venäjällä: ympäristösuunnittelun mahdollisuus paikallisissa hallintatavoissa. Helsinki. Helsingin yliopisto.

O'Dell, C. & Grayson, C. J. Jr. 1998. If Only we knew we know: the transfer of internal knowledge and best practice, New York, The Free Press

Rathcliffe, J.; Stubbs, M. & Shepherd, M. (2004). Urban Planning and Real Estate Development (2nd ed.). London: Spon Press

Wilson, A. G. (2006). Ecological and urban systems models: some explorations of similarities in the context of complexity theory.

Joel D. Wisner & Linda L. Stanley (2007) Process Management: Creating Value Along the Supply Chain. Cengage Learning, ISBN- 978-032-465-471-4. 672 p.

Environment and Planning A, 38 (4), 633-646. Mäntysalo, R. (2000). Land-use planning as inter-organisational learning. University of Oulu.

Senge, P. M. (1992). The Fifth Discipline. London: Century Business.

Herbert A. Simon (1997) Models of Bounded Rationality, Vol. 3: Empirically Grounded Economic Reason. MIT press

Luhmann‟s systems theory and the analysis of planning and planning ambitions. *Planning Theory*, 7 (3), 263-283.

Innes, J. E. & Booher, D. E. (2010). Planning with Complexity. An introduction to collaborative rationality for public policy. London: Routledge.

Doak, J. & Karadimitriou, N. (2007). (Re)development, Complexity and Networks: A Framework for Research. *Urban Studies*, 44 (2), 209-229.

Guy, S. & Henneberry, J. (2002). Approaching development. In S. Guy, & J.Henneberry (eds.), Development and Developers: perspectives on

Wisner, J., Stanley L. 2007. Process Management: Creating Value Along the Supply Chain Cengage Learning. 672 p. ISBN 978-032-465-471-4

Laamanen, K. Tinnilä, M. 2009. Prosessijohtamisen käsitteet. 4. uudistettu painos. Espoo, Suomi: Teknologiateollisuus Oy. 156 s. ISBN 978-952-238-000-5.

Laamanen K. 2001. Johda liiketoimintaa prosessien verkkona. Helsinki, Suomi: Suomen Laatukeskus Koulutuspalvelut Oy. 300 s. ISBN 952-5136-16-7.

Kruus, M. 2008. Suunnittelun ohjausta tukevien menettelyjen kehittäminen projektinjohtorakentamisessa. Väitöskirja. Teknillinen korkeakoulu, insinööritieteiden ja arkkitehtuurin tiedekunta, rakenne- ja rakennustuotantotekniikan laitos. Espoo. 175 s. ISBN 978-951-22-9272-1.

Kiistala, J. 2007**.** Operatiivinen synergia rakennus- ja kiinteistöalan konsernissa. Lisensiaatintyö. Teknillinen korkeakoulu, rakennus- ja ympäristötekniikan osasto, rakentamistalouden laboratorio. Espoo. 115 s.

Ventovuori, T. Kankainen, J. Pekkanen, J. 2002. Projektituotannon asiakkuus. Espoo, Suomi: Otamedia Oy. 87 s. (TKK-RTA-R206). ISBN 951-22-5962-1.

Wideman M. 2003. Comparing PRINCE2 with PMBoK APM Group Ltd, AEW Services, Vancouver, BC, Canada, 2002

Heather E. Canary (2010) Communication and Organizational Knowledge: Contemporary Issues for Theory and Practice. Routledge Communication Series. Taylor & Francis. ISBN 978-041-580-403-5. p. 318

W.R. King , *Knowledge Management and Organizational Learning*, 3, Annals of Information Systems 4, DOI 10.1007/978-1-4419-0011-1_1, Springer Science & Business Media, 2009, p. 3-24

Blackler, F. (1995). "Knowledge, Knowledge Work and Organizations: An Overview and Interpretation". Organization Studies (6): 1021–1046

Awad, E.M. & Ghaziri, H.M. 2004. *Knowlede Management*, Pearson Education International. 456 p.

Koskinen, kaj U., Pihlanto, Pekka & Vanharanta, Hannu (2003) Tacit knowledge acquisition and sharing in a project work context. International Journal of Project Management, vol. 21, n:o 4, p. 281-290

Nonaka, I. & Takeuchi, H. 1995. The Knowledge Creating Company: How Japanese Companies Create Dynamics of Innovation. New York, Oxford University Press. 284p.

Liebowitz, Jay (1999) *Knowledge management handbook.* London and New York: CRC Press

Huber, G.P. 1991. Organizational learning: The contributing processes and the literatures. *Organization Science* 2(1): 88–115.

Menon, T., and J. Pfeffer. 2003. Valuing internal vs. external knowledge explaining the preference for outsiders. *Management Science* 49(4): 497.

King, W.R., and W. Lekse. 2006. Deriving managerial benefit from knowledge search: A paradigmshift? Information and Management 43(7): 874–883.

Cross, R., and L. Baird. (2000). "Technology is not enough: Improving performance by building organizational memory," *Sloan Management Review,* 41(3): 69–79.

King, W.R. 2006a. In "Knowledge sharing": The encyclopedia of knowledge management , D.G. Schwartz, 493–498. Hershey, PA: Idea Group Publishing.

King, W.R. 2006b. In "Knowledge transfer": The encyclopedia of knowledge management, ed. D.G. Schwartz, 538–543. Hershey, PA: Idea Group Publishing.

King, W.R., and D.-G. Ko. 2001. Evaluating knowledge management and the learning organization: An information/knowledge value chain approach. *Communications of the Association for Information Systems* 5(14): 1–26

Levitt, B., and J.G. March. 1988. Organizational learning. *Annual Review of Sociology* 14: 319–340

Davenport, T.H., and L. Prusak. 2000. *Working knowledge: How organizations manage what they know* . Boston, MA: Harvard Business School Press.

Ward, J., and A. Aurum. 2004. *Knowledge management in software engineering – Describing the process* , 137–146., 15th Australian Software Engineering Conference (ASWEC 2004) Melbourne, Australia: IEEE Computer Society Press.

Nonaka, I. & Konno, N. 1998. The concept of "Ba": building a Foundation for knowledge creation. California Management Review, Spring 1998, vol. 40, no. 3. pp. 40-54

Egbu, C. (2000), "The role of tacit and explicit knowledge in improving organisational innovations in architecture, engineering and construction", paper presented at Joint Meeting of CIB W55/W65 and TG31/TG35, Reading, 15 September.

Al-Ghassani, A.M., Robinson, H.S., Carrillo, P.M. and Anumba, C.J. (2002), "A framework for selecting knowledge management tools", Proceedings of the 3rd European Conference on Knowledge Management (ECKM), Dublin, pp. 37-48.

Hall, J., Sapsed, J. and Williams, K. (2000), "Barriers and facilitators to knowledge capture and transfer in project-based firms", paper presented at the Knowledge Management: Concepts and Controversies Conference, University of Warwick, Coventry, 10-11 February.

Herbert S. Robinson, Patricia M. Carrillo, Chimay J. Anumba, Ahmed M. Al-Ghassani, (2005),"Knowledge management practices in large construction organisations", Engineering, Construction and Architectural Management, Vol. 12 Iss: 5 pp. 431 – 445

EFQM (1999), Essentials of Excellence: The Fundamental Concepts and their Benefits, European Foundation for Quality Management, Brussels.

Kaplan, R.S. and Norton, D.P. (1996), "The balanced scorecard – measures that drive performance", Harvard Business Review, Vol. 70 No. 1, pp. 71-9.

Finnish Land Use and Building Act Section 91 b)

Hakkola, E. 2007a**.** Osapuolten intressit hankkeeseen. Teoksessa: Ahlava, A. Edelman, H. (toim.) Urban design management - opas käytäntöön. Suomi: DECOMB -tutkimushanke. 246 s.ISBN 978-951-22-9132-8.

Hakkola, E. 2007b. Hankkeen käynnistämiseen liittyvät sopimukset. Teoksessa: Ahlava, A. Edelman, H. (toim.) Urban design management - opas käytäntöön. Suomi: DECOMB - tutkimushanke. 246 s. ISBN 978-951-22-9132-8.87

Hakkola, E. 2007c. Kunta yhteistyökumppanina - kunnan suunnittelumonopolin merkitys. Teoksessa: Ahlava, A. Edelman, H. (toim.) Urban design management - opas käytäntöön. Suomi: DECOMB -tutkimushanke. 246 s. ISBN 978-951-22-9132-8.

Hakkola, E. 2007d. Kunnan maapolitiikka strategisena valintana. Teoksessa: Ahlava, A. Edelman, H. (toim.) Urban design management - opas käytäntöön. Suomi: DECOMB - tutkimushanke. 246 s. ISBN 978-951-22-9132-8.

Gordon Douglas, Lindroos Annukka. 2012. Urban planning in Helsinki. Edita Oy, Helsinki 2012. www.hel.fi/ksvelsinki (Read 5.6.2013)

Mäkynen, T. 2007a. Kaupunkisuunnittelusta Urban Design Managementiin. Teoksessa: Ahlava, A. Edelman, H. (toim.) Urban design management - opas käytäntöön. Suomi: DECOMB - tutkimushanke. 246 s. ISBN 978-951-22-9132-8.

Mäkynen, T. 2007b. Arvoa kenelle? Asiakkaan ymmärtäminen. Teoksessa: Ahlava, A. Edelman, H. (toim.) Urban design management - opas käytäntöön. Suomi: DECOMB - tutkimushanke. 246 s. ISBN 978-951-22-9132-8.

Mäkynen, T. 2007c. Arvosuunnittelu. Teoksessa: Ahlava, A. Edelman, H. (toim.) Urban design management - opas käytäntöön. Suomi: DECOMB -tutkimushanke. 246 s. ISBN 978-951-22-9132-8.

Mäkynen, T. 2007d. Urban Design Briiffi. Teoksessa: Ahlava, A. Edelman, H. (toim.) Urbandesign management - opas käytäntöön. Suomi: DECOMB -tutkimushanke. 246 s. ISBN 978-951-22-9132-8

Majamaa, W. (2008). The 4th P - People - in urban development based on Public-Private-People Partnership. Espoo: TKK Structural Engineering

Soudunsaari, L. 2007a. Kaavoitus on kommunikaatiota. Teoksessa: Ahlava, A. Edelman, H.(toim.) Urban design management - opas käytäntöön. Suomi: DECOMB -tutkimushanke. 246 s. ISBN 978-951-22-9132-8.

Miles, M.; Berens, G. & Eppli, M. (2007). *Real Estate Development: Principles And Process* (4th ed.). Washington: Urban Land Institute

Finland Use and Building Act Section 91 b Kuronen, M. 2011. The role of partnerships in sustainable urban residential development. Aalto University School Of Engineering, Department of Surveying, Espoo.

A Wilkinson, S & A Reed, R. 2009 Property Development. Taylor & Francis. ISBN 978-041-543-062-3. 382 p.

Maijala, O. 2007a. Yksityishankkeet kunnan strategisessa maankäytön suunnittelussa. Teoksessa: Ahlava, A. Edelman, H. (toim.) Urban design management - opas käytäntöön. Suomi: DECOMB -tutkimushanke. 246 s. ISBN 978-951-22-9132-8

Jauhiainen, J. S. Niemenmaa, V. 2006. Alueellinen suunnittelu. Tampere, Suomi: Osuuskunta Vastapaino. 292 s. ISBN 978-951-768-190-2.

Närhi, K. Pakarinen, T. 2007. Suunnittelun osapuolten yhteisyyden nykyiset muodot taustoineen ja niiden laajentaminen. Teoksessa: Ahlava, A. Edelman, H. (toim.) Urban design management- opas käytäntöön. Suomi: DECOMB -tutkimushanke. 246 s. ISBN 978-951-22-9132-8.

Reed, R.G. (2007) Valuation of real estate, Australian property institute. Canberra

Gils, Wouter van & Kraaykamp, Gerbert, 2008, The Emergence of Dual-Earner Couples : A Longitudinal Study of the Netherlands Published in International Sociology, Vol. 23, No. 3, p.345

Manville, Michael, 2010, Parking requirements as a barrier to housing development: regulation and reform in Los Angeles, Lewis Center for Regional Policy Studies Institute of Transportation Studies, UCL

BBVA Research, 2012, Annual Report 2012 - Economic Analysis, source (read in 3.7.2013): http://www.bbvaresearch.com/KETD/fbin/mult/120221_EAGLEs_Outlook_Annual_Report_2012_tcm348-287658.pdf?ts=412014

Hyppänen, O. 2013. Decision Makers' Use of Intuition at the Front End of Innovation. Doctoral Dissertation, Aalto University, School of Science, Doctoral Dissertation Series 30/2013. Espoo, Finland: Aalto University.

Jokiniemi, E, Davies, N., 2012, Kuvitettu rakennussanakirja suomi-englanti-suomi, Rakennustieto, ISBN10: 9516828906

Vanthournout, D., Olson, K., Ceisel, J., 2008, Return on Learning: Training for High Performance at Accenture, Agate Publishing, Evanston, IL, USA, eISBN: 9781572846258

ANNEXES

INTERVIEWS

Vesa Pirinen, Senior Vice President IT and CIO - 15.1.2013

Jari Hovilehto, Project Manager, Building construction of capital area - 18.1.2013

Jouko Kemppinen, Senior Vice President Investments - 21.1.2013

Jyrki Virtanen, Development Manager, Building Construction - 22.1.2013

Ilkka Jahkonen, Development manager, Residential Construction - 23.1.2013

Jukka Pietilä, senior safety management specialist - 25.1.2013

Timo Lehmus, Senior Vice President, business premises - 1.2.2013

Harri Isoviita, Senior Vice President, Residential Construction - 8.2.2013

Juha Jauhiainen, General Counsel - 8.2.2013

Tero Karislahti, Product manager, Building construction -26.2.2013

Tauno Kestilä, Vice President, Building Construction, Oulu 6.3.2013

Eeva Hirvijärvi, Marketing Director - 8.3.2013

Juha Kostiainen, Senior Vice President, Urban Development and Corporate Relations - 17.4.2013

WORKSHOPS

- 09.10.2012 Helsinki – Kick-off
- 20.11.2012 Helsinki – Comprehensive residential development case studies

- 12.12.2012 Kazan – Responsibility area 1: Project development
- 22.01.2013 Helsinki - Responsibility area 2: Design
- 19.02.2013 St. Petersburg - Responsibility area 3: Construction and procurement
- 4-5.04.2013 Kittilä (Levi) - Responsibility area 4: Sales and Marketing
- 24.04.2013 Bratislava - Best practices workshop 1
- 27.06.2013 Helsinki - Best practices workshop 2
- 16.08.2013 Helsinki - Best practices workshop 3
- 11.09.2013 Helsinki - Best practices workshop 4
- 26.09.2013 Yekaterinburg - Best practices workshop 5
- 29.10.2013 Moscow - Best practices workshop 6
- 17.12.2013 Helsinki – Final meeting

WORKSHOP MEMBERS

Jouko Kemppinen (chairman) - Senior Vice President, Investments, Corporate development

Artak Makaryan - Development Director of Business and Investments. Moscow and Russian Regions.

Elena Krepskaya - Head of Client's Department, Moscow Region, Moskovia

Julia Afanasieva - Head of product and services development department, St. Petersburg, Lentek

Murcko Milan – General Manager, Central Eastern Europe, Reding

Juhani Ylitolonen - Vice President, Building Construction, Lapland

Harri Isoviita - Senior Vice President, Residential Construction

Mikhail Gubkin – Design Director, YIT Lentek

Pavel Kocherezhkin – Deputy Director General, YIT Moskovia

Alexander Smirnov – Head of Investment Department, YIT Moskovia

Jukka-Pekka Uusikoski - Vice President, Corporate Development

Aleksa Pesic – Development manager, investments, Corporate Development

SITE VISITS

Konepaja (YIT's Project) - Helsinki - 20.11.2012

Zvenigorod (YIT's Project) - Kazan - 13.12.2012

Rifei and **Druzpa** (YIT's projects) - Yekaterinburg - 25.9.2013

Four suns - Moscow - 28.10.2013

Centrum Gercenova and **Tarjanne** (YIT's project) - Bratislava - 23.5.2013

Nordbahnprojekt and **Viertel Zwei –** Vienna - 23.5.2013

Shelkovo (YIT's project) - Moscow oblast - 28.10.2013

Vita Nova (YIT's project) St. Petrsburg -19.2.2014

YIT chalets area in Ylläs - Äkäslompolo – 6.4.2013

Espoonlahti (YIT's project) - Espoo - 17.12.2013

APPENDICES

PROJECT MANAGEMENT PROCESS GROUPS

Initiating process group

The management processes are conducted to describe a new project or a new stage of an existing project by obtaining authorization to start the project or stage. Within the initiating processes, the initial scope is defined, and initial financial resources are committed. Internal and external stakeholders who will interact and influence the overall outcome of the project are identified. When the project charter is approved the project becomes officially authorized. As part of initiating process, the complex project such as speculative CRD project is divided into multiple stages. In such projects initiating processes are carried out during subsequent stages to validate the decisions made in previous stages. The success criteria are verified, and the influence and objectives of project stakeholders are reviewed. A decision is then made as to whether a project should be continued, discontinued or delayed. Involving customers and other stakeholder during the initiation generally increases the probability of shared ownership, deliverable acceptance and customer and other stakeholder satisfaction.

Planning process group

The planning process group includes the processes required to establish the scope of the project, refine objectives and targets and define the steps needed to realize the objectives and meet the targets. In other words, the planning processes develop the project management plan and project documents that are used to carry out the project.

Executing process group

The executing process group involves all the processes that are used to realize the objectives and targets indicated in planning documents. This process group includes coordination of people and resources, as well as performing activities indicated in project management plan. Planning processes and executing processes are often aligned as plans need to be refined and updated as the project advances and more information about the uncertainties is gathered.

Monitoring and Controlling process group

The monitoring and controlling process group include those processes required to track, review and regulate the progress and performance of the project. The process group ensures that any required changes to the plan are identified, and corresponding corrections are initiated. The main benefit of this process group is that project performance is measured and observed regularly and consistently to identify changes from the current project management plan.

Closing process group

The Closing process group ensures that the project is officially closed and that customers are satisfied. Closing process group also ensures that learning of organisation and the involved individuals is maximized.

PROJECT MANAGEMENT KNOWLEDGE AREAS

Project Integration Management

Project integration management ensures that necessary activities are conducted during the project for maximizing the probability of successful initiation, planning, execution, control, and closing of the project. Key Decisions in Project Integration Management are resource allocation and trade-offs among competing objectives and alternatives. The Key activities are:

- **Development of project charter;** developing a document that formally authorizes the existence of a project
- **Develop project management plan;** defining, preparing, and coordinating all subsidiary plans and integrating them into a comprehensive project management plan.
- **Direct and Manage project work;** leading and performing the project work
- **Monitor and control the project work;** tracking, reviewing, and reporting project progress against the performance objectives defined in the project management plan.

- **Perform integrated change control;** reviewing change requests; approving changes and managing changes and communicating their disposition.

- **Close project or phase;** finalizing all activities across all of the Project Management Process Groups to officially complete the phase or project.

Project Scope Management

Project scope management ensures that all the necessary work is included, and only the necessary work, to optimize stakeholder satisfaction. Scope management can be divided into two parts: the project scope management and the product scope management. The project scope includes the work that needs to be accomplished to deliver a product, service, or result with the specified features and functions. The product scope includes the functions and features that characterize quality and costs of a product and/or service. Key activity groups in Project scope management are:

- **Plan Scope Management**; documenting how the project scope will be defined, validated, and controlled.

- **Collect requirements**; determining, documenting, and managing stakeholders needs

- **Define scope**; detailed description of the project and the product

- **Create Work Breakdown Structure (WBS);** Subdividing project and deliverables in smaller components

- **Validate Scope**: formalizing acceptance of the completed project deliverables

- **Control scope**; monitoring scope and managing changes to the scope baseline.

Project Time Management

Project time management ensures that the project schedule is realistic and optimal, and the project is completed as scheduled or that project duration is optimized for ensuring maximal stakeholder satisfaction. Project Time Management includes following processes:

- **Plan Schedule Management;** establishing the policies, procedures, and documentation for planning, developing, managing, executing, and controlling the project schedule.
- **Define Activities**; identifying the specific actions to be performed
- **Sequence Activities**; identifying and documenting relationships among the activities
- **Estimate Activity Resources**; estimation of resources needed to perform each activity
- **Estimate activity durations**; estimation of the work durations with estimated resources
- **Develop schedule**; optimizing durations, resources and activity relations
- **Control Schedule**; monitoring and managing updates to project schedule

Project Cost Management

Project cost management ensures that the project can be completed within approved budget. Project cost management includes the following processes:

- **Plan Cost Management**; establishing the policies, procedures, and documentation for planning, expending, managing, and controlling project costs.
- **Estimate Costs**; estimation of monetary resources needed to complete the project
- **Determine Budged**; aggregating the estimated costs in order to establish authorized cost baseline
- **Control costs**: minimizing cost overruns and updating project budget and managing changes to the costs baseline.

Project Quality Management

Project Quality Management consists of processes and actions of the performing organization that define objectives, quality policies, and responsibilities so that the project will satisfy the stakeholder needs. It implements the quality management system through procedures and

policy with constant process improvement activities conducted throughout, as appropriate. Project Quality management includes the following processes:

- **Plan Quality Management**; identifying quality requirements and/or standards for the project and product and documenting how project will demonstrate compliance
- **Perform Quality Assurance**; auditing the quality requirements and the results of quality control measurements
- **Control Quality**; monitoring and recording the quality

Project Human Resource Management

Human resource management ensures that adequate qualitative and quantitative human resources are allocated for the project, and the project team does the right work at the right time. Ensuring above-mentioned aspects of a project management is more complex task as the project team and activities change in different stages of the project. For instance, early participation and involvement of team members increases their expertise during the planning process and reinforces their commitment to the project. Project Human Resource Management includes the following processes:

- **Plan Human Resource Management**; identifying and documenting project roles, required skills, responsibilities and hierarchy, and creating staffing management plan
- **Acquire Project Team**; obtaining team necessary to complete the project objectives
- **Develop Project Team**; improving the individuals' and the team's work performance
- **Manage Project Team**; tracking performance, giving feedback, resolving issues and optimizing project team

Project Communications Management

Project communication management ensures appropriate and timely generation, collection, distribution, storage, retrieval, and ultimate disposition of project information. Effective communication and unbroken flow of information are essential for every project's success. It

creates a bridge between stakeholders and different levels of expertise involved in a project. Key activities in project communication management are:

- **Plan communication management**; defining the stakeholder communication needs and the developing appropriate approach
- **Manage Communications**; creating, collecting, storing, distributing, retrieving and the ultimate disposition of project information
- **Control Communications**; ensuring that the information needs of the project stakeholders are met.

Project Risk Management

Successful project risk management decreases the probability and impact of negative events and increases the probability and impact of positive events in the project. Project Risk Management includes the following processes:

- **Plan Risk Management;** defining how to conduct risk management activities
- **Identify Risks**; determining and documenting risks that may affect the project
- **Perform Qualitative Risk Analysis**; prioritizing risk for further analysis
- **Perform Quantitative Risk Analysis**; numerically analysing the effect of the risks
- **Plan Risk Responses**; developing options and actions for mitigating risks
- **Control Risks**: implement risk response plan, monitoring its rate of success, and identifying and adapting to new risks

Project Procurement Management

Project Procurement Management ensures that procurement needs, methods and potential sellers are identified. Additionally, the procurement management ensures that the good environment for successful procurements is created through preselection of sellers and contract management. Finally, project procurement management ensures that the

procurements are controlled and closed appropriately. Project Procurement Management includes the following process groups:

- **Plan Procurement Management;** documenting project procurement needs and decisions, specifying the procurement methods, and identifying potential sellers.
- **Conduct Procurements;** obtaining seller responses, selecting a seller, and awarding a contract.
- **Control Procurements**; managing procurement relationships, monitoring contract performance, and making corrections and changes as appropriate.
- **Close Procurements;** completing project procurements.

Project Stakeholders Management

Project Stakeholder Management ensures that the people, groups, or organizations that could impact or be impacted by the project are identified. Secondly, the Project stakeholder Management ensures that stakeholder expectations and their impact on the project are analyzed. Finally, the appropriate management strategies for effectively engaging stakeholders in project decisions and execution are developed. Effective stakeholder management also ensures continuous communication with stakeholders to understand their expectations and needs and the issues are responded as they occur. Managing conflicting interests and fostering proper stakeholder engagement in project activities and decisions is crucial for successful projects. Stakeholder satisfaction is a key project objective. Project stakeholder management includes the following processes:

- **Identify Stakeholders**; identifying all the needs and expectations of all the individuals, groups or organizations impacted by the project
- **Plan Stakeholder Management;** developing appropriate management strategies to effectively engage stakeholders throughout the project life cycle.

- **Manage stakeholder engagement**; active communication with stakeholders
- **Control Stakeholder Engagement**; monitoring and adjusting strategies and plans for engaging stakeholders.

Additionally there are four project management knowledge areas that address critical success areas of construction project management, which are as follows:

Project Safety Management

Project Safety Management includes the processes required to ensure that accidents are prevented, and personal injury and property damage are avoided. Project Safety management includes the following activities:

- **Safety Planning;** development of the approach to manage the various hazards to safety inherent in the project
- **Safety Plan Execution**; carrying out the safety plan
- **Administration and reporting**; safety monitoring and reporting safety activities

Project Environmental Management;

Project Environmental Management ensures that the project follows all laws and regulations pertaining to the environment affected by the project. Project Safety management includes the following activities:

- **Environmental Planning;** how to satisfy identified environmental standards
- **Environmental assurance**; evaluating results of environmental management
- **Environmental control**; monitoring and controlling unwanted environmental impact

Project Financial Management

Project Financial Management includes the steps needed to acquire and manage the financial resources for the project. Project Financial management is more concerned with a revenue

source and analyzing/updating net cash flows for the construction project than is cost management. Project Financial management includes following processes:

- **Financial Planning;** Identifying key financial issues to be addressed
- **Financial Control**; Monitoring key influences and taking corrective measures
- **Administration and records**; designing and maintaining a financial information storage/retrieval database to enable financial control

Project Claim Management;

Project Claim Management prevents or eliminates construction claims from arising and ensures efficient handling of claims when they occur. Claim management is similar to risk management and consists of the following four processes:

- **Claim identification;** Identifying key claim issues to be addressed
- **Claim quantification**; Monitoring key influences and taking corrective measures
- **Administration and records**; designing and maintaining a financial information storage/retrieval database to enable financial control